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#ADMINISTRATIVE OFFICE: American Meteorological Society, Office of Executive Secretary, 45 Beacon Street, Boston 8, Mass.

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INSTRUMENTS AND METHODS OF OBSERVATION AND INSTRUMENT CARRIERS

(A Compilation of Backlog Abstracts for 1950–59)

Compiled by: Muriel F. Haas

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EXPLANATIONS

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The word or abbreviation for Volume (Tom, Band, Jahrgang, Año, etc.), for Number (Heft, Fascicule, Vypusk, etc.) and for page or pages is omitted from most entries. Thus an entry will read as follows:

Meteorologische Rundschau, 2(5/6):146–151, May/June 1950.

This indicates that the article appeared in *Meteorologische Rundschau*, *Jahrgang* 2 (Vol. 2), *Heft* 5/6 (No. 5/6), *pages* 146–151, May/June 1950.

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INSTRUMENTS AND METHODS OF OBSERVATION AND INSTRUMENT CARRIERS

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INTRODUCTION

This is the first of several special issues of *Meteorological Abstracts and Bibliography*, each composed of abstracts on a single phase, or in closely related phases, of meteorology. The material is chosen from a backlog of over 12,000 unpublished abstracts which have accumulated during the past 5 or 6 years. The articles abstracted come from publications issued during the period 1950–59 in a dozen languages and from 40 countries. At least 3000 of these will be published as supplementary issues to Vol. X (1959) in order that they may be included in the decennial indexes (for Vol. I–X) of *Meteorological Abstracts and Bibliography* now being prepared.

The material comprises all, or nearly all, of the backlog of unpublished abstracts of articles dated prior to 1960 in the following 3 categories, arranged according to the Universal Decimal Classification (U.D.C.) System for Meteorology, except in a few cases where modifications have been made:

551.501 **Methods of Observation and Computation** (Items 621–866)
551.507 **Instrument Carriers** (Items 867–901)
551.508 **Instruments** (Items 1–620)

However, since by far the largest amount of material (620 Items) is on Instruments, this category is placed first, Methods of Observation (245 Items) second, and Instrument Carriers (34 Items) last. No cross referencing has been attempted. However, the subject index in Part D should give a quick lead to the entire range of subject matter and the types of instruments.

Although much of the best material on these subjects has been selected for inclusion in the 110 regular issues of *Meteorological Abstracts and Bibliography* published during 1950–59, the present compilation of 900 abstracts amounts to about 25% of the total published literature in these fields of meteorology and hence, is bound to contain considerable first rate material which could not be crowded into the monthly issues. Thus, it is believed that the orderly arrangement of so large a mass of abstracts on a narrow range of subject matter will more than compensate for the fact that some of the material is of secondary importance or lacks currency.

The two subsequent compilations of backlog material will be of about the same size and will cover studies on:

2) **Precipitation** (rain, snow, hail) **and hydrometeorology** (551.577–79)
3) **Agricultural meteorology** (551.5:63)

Similar accumulations are planned on:

4) **Synoptic analysis and forecasting** (551.509)
5) **General and local circulation studies** (551.511–15)
6) **Radiation and temperature** (551.521–24)

These will be published as supplementary issues to Vol. XI (1960).

The following systematic subject outline shows in detail the arrangement of material included herein. The U.D.C. numbers corresponding to each heading are given as an aid to the user who wishes to locate analogous material in the regular issues of *Meteorological Abstracts and Bibliography* (Vol. I–X) or in current or future issues of *Meteorological and Geoastrophysical Abstracts*. At least 20 abstracts on Instruments and Observation appear in each issue. Monthly and annual subject indexes give a more direct lead to abstracts on particular types of instruments or methods of observation.

The following issues of *Meteorological Abstracts* contain systematic compilations of abstracts on **Instruments and Instrument Carriers**:

Vol. 5, No. 5, May 1954	**Balloons**
Vol. 11, No. 9, Sept. 1960	**Rocket Meteorology**
Vol. 11, No. 10, Oct. 1960	**Satellite Meteorology**

and the following on Methods of Observation:

Vol. 2, No. 4, April 1951	**Constants, tables and nomograms**
Vol. 2, No. 8, Aug. 1951	**Radar Storm Detection**
Vol. 4, No. 11, Nov. 1953	**Sferics** (also Vol. 10, No. 4, April 1959)
Vol. 6, No. 7, July 1955	**Radar Cloud Physics**
Vol. 6, No. 11, Nov. 1955	**Cooling Power Measurement**
Vol. 9, No. 8, Aug. 1958	**Radar Meteorology** (also Vol. 11, No. 8, Aug. 1960)
Vol. 10, No. 8, Aug. 1959	**Evaporation Measurement**

The present and subsequent special issues of backlog material, together with the Decennial Indexes for 1950–59 are being compiled and published with the aid of funds provided by the National Science Foundation for this specific purpose. Most of the original abstracting was done under contract with the Air Force Cambridge Research Center during 1949–59.

MALCOLM RIGBY
March 1961

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PART A. METEOROLOGICAL INSTRUMENTS (551.508)

METEOROLOGICAL INSTRUMENTS (GENERAL) (551.508)

10L–1 551.508:551.510.53:620.16

Altitude test chamber. *Instruments*, Pittsburgh, 26(8):1144, Aug. **1953.** photos. **DWB**—Two announcements describing "Strato-Chamber" (Hudson Bay Div., Refrigeration System, Inc., Chicago) and "Altitude Simulation Chamber (Murphy & Miller, Inc., Chicago) with temperature, humidity and pressure control for environmental test purposes. Illustrations of the two chambers are presented. *Subject Headings:* **1. Test chambers 2. Calibration equipment.**—*G.T.*

10L–2 551.508:681.2.087

Atanasov, At., **Nov tip pistsi za samopisheshti uredi.** [New type of pen for automatic recording instruments.] *Khidrologiia i Meteorologiia*, Sofia, No. 4:54–56, **1956.** 3 figs. **DLC**—A conical brass pen is described and shown in drawings. The pen is particularly useful at mountain stations due to its capability of prolonged continuous operation (5–9 weeks). It has also been adapted for anemographs and limnographs (in horizontal position). *Subject Headings:* **1. Automatic recorder pens 2. Automatic recorders.**—*G.T.*

10L–3 551.508:681(02)

Behar, Manoel Felix de Mayo, **Principles, properties, and things common to all instruments.** (In his: **The handbook of measurement and control.** Pittsburgh, Pa., Instruments Pub. Co., **1951.** p. 1–60. 126 figs., 10 tables, eqs.) **DWB**—A systematization of the science of instruments. General logical problems are discussed and a review of "industrial" and "scientific" classifications is given. Factors influencing accuracy and "the dynamic properties of systems and components" are analyzed. Much attention is paid to a description of different kinds of prime relays. *Subject Headings:* **1. Instrument manuals 2. Instrument accuracy.**—*A.A.*

10L–4 551.508:531.74

Boerdijk, A. H. (*Kievitlaan 5, Eindhoven, Netherlands*), **Instrument for the direct measurement of angles in the field of view of the naked eye.** *Review of Scientific Instruments*, N. Y., 26(4):382–383, April **1955.** fig., 2 refs. **DLC**—The instrument described contains an illuminated scale of which a virtual image is formed at infinity by means of a spherical mirror and a glass plate. The image of the scale is superimposed on the normal field of view of the naked eye, enabling direct measurement of angles in that field. *Subject Heading:* **1. Angular measurement.**—*Author's abstract.*

10L–5 551.508:629.13

Brombacher, William G., **Aviation instruments.** (In: Behar, M. F. de M. (*ed.*), **Handbook of measurement and control.** Pittsburgh, **1951.** p. 273–282. 9 figs., 7 tables.) **DWB**—Comprehensive annotated list of instrumentation, including measurement of pressure, vertical speed, drift, free air temperature, and an evaluation of the best instruments. Brief explanations and principal circuit diagrams given. *Subject Heading:* **1. Aeronautical instruments.**—*A.A.*

10L–6 551.508 551.508.92

Chace, W. G. and Cullington, E. H., **Instrumentation for studies of the exploding wire phenomenon.** *U. S. Air Force. Cambridge Research Center, Instrumentation for Geophysical Research*, No. 7, Aug. **1957.** 35 p. 13 figs. (incl. photos), table, 46 refs., eqs. **DLC, DWB** (M08 4582i)—Types of problems encountered in instrumenting an exploding wire experiment are discussed and some methods of solving such problems are delineated. A satisfactory method of controlling the experiment and its instruments, using a light beam isolating system, is described in detail. Also, satisfactory methods of measuring current and light intensity are fully described; the use of photography in recording EWP is discussed; an analysis is given of the type switch recommended; and a convenient scheme for operating two cathode ray oscillographs with simultaneous sweeps is described. *Subject Heading:* **1. Exploding wire phenomenon instrumentation.**—*Authors' abstract.*

10L–7 551.508:061.6

Deisinger, Delbert A. (*Chief, Met. Br., Evans Signal Lab.*), **Signal Corps meteorological instrumentation program.** *Weather Radar Conference, 5th, Sept. 1955, Proceedings*, pub. **1956.** p. 1–6. **DWB**—The present aim of research and development in the field of meteorology is to obtain data on, and develop an understanding of, the atmosphere as well as the meteorological techniques involved. Development of data storage and processing equipment would naturally strengthen the USAF and the Army. *Subject Headings:* **1. Meteorological instruments 2. Meteorological research 3. Electronic data processing.**—*N.N.*

10L–8 551.508

German-American Trade Promotion Office, Cologne, **Scientific instruments made in Germany.** Wiesbaden, Otto K. Krausskopf, **1953.** 44+42 p. illus. **DWB**—A guide to West German instrument industry containing a) a list of instruments referring to the manufacturers producing them and b) a list of manufacturers, giving their addresses, brief history and summary of activities. An illustrated catalog arranged by producers is appended. The products included in the guide comprise a complete line of meteorological instruments. *Subject Headings:* **1. Instrument catalogs 2. Meteorological instruments.**—*G.T.*

10L–9 551.508

Haenni & Cie., Jegenstorf, **Instruments de mesure avec cadre frontal carré.** [Measuring instruments with square panel mounting.] *Nouvelles de Haenni,* no. 53, Jan./Feb. **1955.** 4 p., 5 figs. **DWB**—Various ways in which square faced dial type instrument mountings can be arranged on a panel are described and illustrated. The square cases can be had for pressure, vapor pressure and telethermometer instruments. They are made according to Swiss standards. *Subject Headings:* **1. Meteorological instrument mountings 2. Instrument panels.**—*M.R.*

10L–10 551.508:621.398:681.14:621.38

Hall, Gilbert O., **A digital electronic data recording system for pulse-time telemetering.** Ed. by Robert M. Slavin. *U. S. Air Force. Cambridge Research Center, Instrumentation for Geophysical Research,* No. 1, Feb. **1953.** 47 p. 28+11 figs. (incl. photos). **DWB**—In the past, the methods used for scaling telemetering records have been time consuming and not too accurate. The DIGER system provides a means of producing at high speed sample-by-sample records of the telemetered information in digital form and at a slower rate, printing the values of voltages recorded. The system has been designed to handle two channels of pulse-time telemetering. The delay of a telemeter pulse, which is a measure of the voltage telemetered, is converted into a train of pulses. These pulses are counted by a digital chain and the coded result is displayed on neon lights which are photographed. This process is repeated at the repetition rate of the system (569 pulses per sec). The photographic record is then scanned by photoelectric means, decoded, and the result printed on electric typewriters. The system is currently in use for recording and reduction of data telemetered from U. S. Air Force Aerobee rocket flights for upper air research. The equipment can be expanded to handle more channels or modified to operate with other types of modulation. The method is adaptable to digital range measurements and laboratory recording of large quantities of data. *Subject Headings:* **1. Telemetering systems 2. Digital computers 3. Electronic computer applications.**—*Author's abstract.*

10L–11 551.508:551.593.11

Hanson, Fred S., **Atmospheric refraction errors for optical instrumentation.** *U. S. White Sands Proving Ground, New Mexico, Technical Memorandum,* No. 104, Oct. 15, **1953.** 18 p. 3 figs., table, 8 refs., 20 eqs. **DWB**—Differences are brought out between guided missile refraction geometry and astronomical refraction geometry. A simple relationship between angular refraction of light, refraction error for ground observer, and refraction error for aerial observer is demonstrated. While angular refraction of light depends only on the extent of appreciable density of the atmosphere, the two types of refraction error continue to vary beyond this point, due to geometry. Basic equations for atmospheric refractive index, angular refraction, and refraction errors for ground and aerial observers are derived from physical principles, without resort to empirical equations or graphical integration. Previously available equations for angular refraction and refraction errors were applicable only to altitudes of less than 10 mi or only to infinite altitudes. Present equations hold for any altitude. Methods of this report are capable of application to any atmospheric temperature profile. *Subject Headings:* **1. Atmospheric refraction 2. Instrument errors.**—*Author's abstract.*

10L–12 551.508(085)

Heath & Co., London, **[Catalog], Sections K, L, and M.** p. 114–157 of their complete thermometer catalog E 448. [**1953?**]. diagrs. **DWB**—Illustrations and brief technical specifications are offered for different models of Hezzanith thermographs, barographs, hygrographs, planimeters, anemometers, barometers, thermometers, hygrometers, psychrometers, etc. The "Hezzanith Meteorological Set," consisting of basic instruments in a wooden carrying case, is one item among the many instruments featured in this catalog. *Subject Heading:* **1. Instrument catalogs.**—*G.T.*

10L–13 551.508:681.1

Hogley, B., **An instrument to measure and compute the mean and standard deviation of the oscillations of a recording arm.** *Journal of Scientific Instruments,* London, 29(3):76–81, March **1952.** 6 figs. **DWB**—The instrument consists of a measuring unit (contact bank and brush) and

a computing unit constructed from relays and message registers. It records the sums of y and y^2 of an irregularly moving pen arm. *Subject Heading:* **1. Computing machines.**—*C.E.P.B.*

10L–14 551.508:551.551

†Iaglom, A. M., **Ob uchete inertsii meteorologicheskikh priborov pri izmereniiakh v turbulentnoĭ atmosfere.** [Calculation of the inertia of meteorological instruments during measurements in a turbulent atmosphere.] *Akademiia Nauk SSSR. Geofizicheskiĭ Institut, Trudy*, No. 24 (151):112–162, **1954.** 11 figs., 2 tables, 29 refs., 129 eqs. **DLC** (QC801.A37)—An investigation of the problem of the differences in the readings of meteorological instruments (giving instantaneous readings of the measured magnitudes) resulting from their inertia. The characteristics of the inertia of linear instruments, the effect of inertia of a linear instrument upon the mean square value of its reading and the evaluation of the random error of linear instruments; the dynamic theory of the cup anemometer and the solution of its fundamental equation; the effect of the inertia of the cup anemometer upon the mean square value of its readings and the evaluations of the systematic error of this type of anemometer are analyzed mathematically. An appendix contains a discussion of the structure of the wind field in the atmosphere. *Subject Headings:* **1. Instrument errors 2. Cup anemometers.**—*I.L.D.*

10L–15 551.508:551.594:53.082.7

Israël, H. and Dolezalek, H., **Vorschläge zur Darstellung atmosphärisch-elektrischer Ergebnisse.** [Forms for the reproduction of the results of atmospheric electric registrations.] (In: Israël, H. (*ed.*), **Luftelektrizität im A.G.I.: Bericht über die Tagung in Aachen am 11.–12. Mai 1956.** pub. Aachen, **1957.** p. 115–116. Summaries only in German and English. ref.)—The graph paper as developed and used in synoptic and air electrical works in the Alps has several advantages. The various graphs for the individual observations are printed in color on tracing paper enabling easy plotting of data and comparison to be made simply by superimposing one sheet of paper on another. *Subject Headings:* **1. Atmospheric electricity data 2. Graphic presentation.**—*W.N.*

10L–16 551.508

Lüdtke, Heinz, **Ein Hilfsgerät zum Ausmessen von Oszillogrammen.** [An aid to evaluating oscillograms.] *Naturwissenschaften*, 40(11):313, June 1, **1953.** fig. **DWB**—This apparatus for accurate measurement of thermograms, barograms etc. includes parallel rulers and an upright graduated scale carrying a vernier. *Subject Heading:* **1. Tabulating equipment.**—*C.E.P.B.*

10L–17 551.508:797.5

New gliding instruments. *Gliding*, London, 4(3):118–119, Autumn **1953.** illus. **DWB**—Four new instruments designed by P. Temple for use in gliders are described. These instruments were tested during the British National Gliding Championships of 1953. They are (1) an electric variometer (a supplement to the conventional variometer), (2) a small total energy venturi, (3) a barograph and (4) a combined barograph and air speed indicator. Two of the instruments (the barograph and the venturi) are shown in photographs. *Subject Heading:* **1. Gliders.**—*G.T.*

10L–18 551.508:681

The 1954 Instruments Index. *Instruments*, Pittsburgh, Pa., 26(8/II), Aug. **1953. DWB**—American instrument manufacturers and their products are listed in two sections. Section 1 (Index Section) gives an alphabetical arrangement of designations of instruments, each designation being followed by the names of the companies manufacturing the instrument. Laboratory supply houses can be found under "Apparatus, Laboratory." Section 2 (Descriptive Directory) presents the names of 889 firms, indicating their principal products. *Subject Headings:* **1. Instrument catalogs 2. Instrument makers.**—*G.T.*

10L–19 551.508:551.521.3

Martinsen, Knut and Sørobye, Håkon, **Mikrobølgeapparatur for måling av absorbsjon, Pt. 1, Atmosfaeren ved 3 cm bølgelengde.** [Microwave apparatus for measurement of absorption, Pt. 1, Atmospheric absorption at 3 cm wavelength.] *Norway. Forsvarets Korskningsinstitutt, Årbok*, No. 2:133–175, **1948/1949.** numerous figs., 2 refs. **DLC**—Detailed description and illustrations of apparatus and its circuits. *Subject Heading:* **1. Microwave absorption equipment.**—*M.R.*

10L–20 551.508(02)

†Palm, Albert, **Registrierinstrumente.** [Recording Instruments.] Berlin, Springer-Verlag, **1950.** 220 p. 203 figs., 6 tables, bibliog. p. 212–217. **DLC** (QC53.P3). Transl. into Russian as **Registriruiushchie samopishushchie pribory.** Moscow, Izdat. Ionostrannoĭ Literatury, **1955.** 272 p.

191 figs., 6 tables, 347 refs. **DLC** (QC53.P317)—Systematic treatment of various aspects of recording instrument technology: 1) continuous and intermittent recording in general; 2) clock, weight and electrical driving mechanisms; 3) linkage and recording mechanisms; 4) evaluation of records, and 5) applications in science and technology of many types of meteorological recording instruments are discussed on p. 106–112 (p. 133–141 in Russian edition). Other instruments used widely in meteorology are treated in other sections (aneroid recorders, temperature, humidity, light intensity, wind and radiation instruments). An excellent bibliography and subject index are appended. Over 200 instruments or circuits are illustrated. The manufacturers and the reference citations are faithfully annotated. *Subject Headings:* **1. Recording instruments 2. Instrument textbooks 3. Meteorological recording instruments. I. Roth, Heinz.**—*M.R.*

10L–21 551.508

Pour améliorer les conditions de transport des instruments de mesures scientifiques, l'UNESCO recommande un amenagement approprié des inspections douanierés. [In order to improve means of transporting scientific measuring instruments, UNESCO recommends a suitable amendment to customs inspection regulations.] *International Union of Geodesy and Geophysics, Bulletin d'Information*, 2(2):347–348, April **1953.** **DWB**—Note on the mechanism set up by UNESCO to allow freer and safer exchange of scientific instruments for standards, calibration, etc. between countries and without customs difficulties. *Subject Heading:* **1. Instrument exchange between countries.**—*M.R.*

10L–22 551.508

Basic instrumentation at the National Bureau of Standards. *Science*, Wash., D. C., 118(3069): 457–461, Oct. 23, **1953.** 6 figs., 5 refs. **DWB**—Developments made at the U. S. Bureau of Standards which are of interest to meteorologists are hygrometers, thermal noise thermometers, microwave refractometers, the CO_2 hypsometer (for upper air research), rate of flow meters, gas composition apparatus, etc. Some of these are illustrated. *Subject Headings:* **1. Meteorological instruments. I. U. S. National Bureau of Standards.**—*M.R.*

10L–23 551.508(085) 551.5:37

Science Associates, Princeton, N. J., **Catalog.** [**1955.**] 49 p. numerous photos. **DWB**—Contents: Temperature. Humidity. Barometers. Sunshine. Wind. Precipitation. Weather teaching aids. Astronomy study aids. Study aids (atlases and dictionaries). Geophysics. Address: P.O. Box 216, 194 Nassau St., Princeton, N. J. Each of a wide variety of equipment and instruments is described in detail and illustrated and current prices given. Nineteen books are also listed for sale. *Subject Headings:* **1. Instrument catalogs 2. Teaching of meteorology.**—*M.R.*

10L–24 551.508

Shinners, Willard W., **Shipboard test of meteorological instruments.** *Mariners Weather Log*, Wash., D. C., 1(5):127–130, Sept. **1957.** 2 figs. **DWB**—The following meteorological instruments have been tested by the U. S. Weather Bureau in cooperation with the Maritime Administration and the Navy's David Taylor Model Basin in order to combat the troughs of gigantic storms: a direct reading anemometer, a remote reading sea water temperature indicator. Tests are conducted aboard the "Nelson" and "Chew" in order to improve the present meteorological instruments and establish specifications for installation of meteorological instruments in new ship construction. *Subject Heading:* **1. Meteorological instruments on ships.**—*N.N.*

10L–25 551.508:551.506.22

Skachkova, I. F., **Meteorologicheskie pribory v period Mezhdunarodnogo geofizicheskogo goda.** [Meteorological instruments during the IGY.] *U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoi Sluzhby. Komitet po Provedeniiu Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyi Sbornik*, No. 4:92–96, **1957.** 4 figs. **DWB**—The author describes nonstandard instruments used during the IGY for actinometric, atmospheric electricity and ozone measurements. As an automatic recorder of different types of radiation the pyrometric switch millivoltmeter with a sensitivity of measurement of 2.5–6.5 mv at a resistance of 70–120 ohm was used. The speed of the tape was increased to 10 mm/hr at an interval of 2 min between points of writing. To the galvanometer were added supplementary resistances allowing a recording of total radiation up to 2 cal/cm² min on 3/5 of the scale for a pyrometer with a sensitivity of 8.5 cal/cm² min, and resistances of 35 ohm for recording diffuse radiation up to 0.7 cal/cm² sec on a 2/5 scale for the same pyranometer. A shadow ring for the pyranometer head specially constructed for the Principal Geophysical Observatory is described with the aid of a diagram. A modernized Ångström pyrheliometer constructed by Iu. D. Tanishevskiĭ is described and a photograph of the apparatus is presented. It has the advantage in that the entrance openings of the instrument are uniform with the entrance openings of the

thermoelectric actinometer. Descriptions and illustrations are given of both an underwater pyranometer and an instrument for measuring the electric field potential. *Subject Headings:* **1. Meteorological instruments 2. IGY instruments.**—*I.L.D.*

10L–26 551.508:061.1(09)

Skelton, P. N., **Instruments Branch: brief history and statistical record. 1952.** 9 p. typescript. **GB-MO**—List of officers in charge of the Instruments Branch of the British Meteorological Office, instruments supplied, development, accommodation, expenditure and staff. A list of instruments designed in the Branch and an account of testing and calibration are added. *Subject Headings:* **1. British Meteorological Office, Instruments Branch 2. Meteorological instruments.** —*C.E.P.B.*

10L–27 551.508(085)

Taylor Instrument Companies, Rochester, N. Y., **Better farming and better living through measurement of temperature, humidity, barometric pressure.** [1953.] 23 p. diagrs., photos.—Various types of thermometers, barometers and hygrometers manufactured by Taylor Instrument Companies are described and illustrated in this pamphlet; their use in various farming operations, weather observation, etc., is explained. *Subject Headings:* **1. Instrument catalogs 2. Thermometers 3. Barometers 4. Hygrometers.**—*G.T.*

10L–28 551.508:553.62

Tebo, Albert R. and Clark, Layton E., Jr., **Quartz crystal meteorological elements.** *Weather Radar Conference, 5th, Sept. 1955, Proceedings*, pub. **1956.** p. 229–234. **DWB**—The Meteorological Branch of the U. S. Signal Corps Engineering Laboratories contracted with Armour Research Foundation of Illinois Institute of Technology in 1948 and 1951 to study the piezoelectric properties of quartz crystals and the possibility of using quartz crystals as sensing elements for temperature, pressure and humidity. The results showed that the pressure units were not usable for any meteorological purposes, but the temperature crystal has proved to be accurate. *Subject Headings:* **1. Quartz crystals sensing elements 2. Temperature sensing crystals.**—*N.N.*

10L–29 551.508:620.16:53.089.6

Temperature test chamber [and] Temperature and humidity test chambers. *Instruments*, Pittsburgh, 26(8):1142, Aug. **1953.** 3 photos. **DWB**—Three announcements describing "Model TC-1 Temperature Test Chamber" (Statham Development Corp., Los Angeles), "High-Low Temperature Bench-Type Test Chamber" (Webber Mfg. Co., Indianapolis) and a multi-range test chamber (Murphy & Miller, Inc., Chicago). Performance details are indicated. Illustrations of the three units are presented. *Subject Headings:* **1. Test chambers 2. Calibration equipment.** —*G.T.*

10L–30 551.508:535.33

Thomas, B. W., **Instrumentation.** *Industrial and Engineering Chemistry*, Wash., D. C., 47(1): 79A–81A, Jan. **1955.** port. **DWB, DLC**—Advances during 1954 in instrumentation, especially mass spectrometry, continuous reading of vapor pressure, recording-telemetering systems, etc. by various U. S. manufacturers, are summarized. *Subject Headings:* **1. Meteorological instruments 2. Mass spectrometers.**—*M.R.*

10L–31 551.508:629.13

U. S. Air Weather Service, **The system for programming funding and installation of fixed meteorological facilities on Air Force bases.** Its *Air Weather Service Manual* 86-1, April **1, 1957.** 14 p. tables. **DWB**—Meteorological equipment has, in the past five yrs, become so complicated that one man cannot personally install and supervise maintenance or repair of the observing equipment. This manual outlines procedures for the complicated business of programming, procuring equipment and installing and/or maintaining it at U. S. Air Force bases. Even the financing becomes a major part of the responsibility in programming. Channels for such action as is necessary are shown schematically and described. *Subject Headings:* **1. Meteorological stations 2. Instrument maintenance 3. Airport meteorological equipment.**—*M.R.*

10L–32 551.508

U. S. Weather Bureau, **Instruments used in weather observing.** Wash., D. C., Sept. **1955.** 4 p. figs., photos. **DWB**—Photographs with brief description of numerous U. S. Weather Bureau instruments such as wind, temperature, dew point, pressure, precipitation, cloud, snow depth, radar and radiosonde equipment. *Subject Heading:* **1. Meteorological instruments.**—*M.R.*

INSTRUMENTS FOR DETERMINING RADIATION AND TEMPERATURE (551.508.2)

10L–33 551.508.2:551.521.6

Collmann, Wolfgang, **Zur Frage des Reduktionsfaktors für das Strahlungsfilter RG2.** [On the reduction factor of the radiation filter RG2.] *Annalen der Meteorologie*, 5(7/12):404–406, **1952.**—Discussion of reduction factor on 650 and 625 mμ. *Subject Heading:* **1. Radiation filters.**—*C.E.P.B.*

10L–34 551.508.2 551.521.12:535.214

Drummond, A. J. (*Eppley Lab., Inc., Newport, R. I.*), **An examination of filter radiometry.** *Eppley Laboratory, Inc., Newport, R. I., Reprint Series*, No. 7, **1957.** 4 p. 5 figs. **DWB.** Reprinted from *Perkin-Elmer Instrument News*, Vol. 9, No. 2.—A thorough review of several aspects of filter radiometry or the use of filters to determine the intensity of radiation from the sun in discrete spectral bands (usually with sharp cut-off at the lower wave length end of the band), particularly in the infrared (to 2500 mμ) and the UV (270–380 mμ), extreme UV (200–280 mμ), such as in ozone studies, etc. Instrumental requirements, wave length calibration, effect of temperature and of material thickness, and laboratory work of the Geophysical Observatory and laboratories of the Eppley Laboratory are discussed and illustrated. *Subject Headings:* **1. Filter radiometry 2. Radiation measurements 3. Radiation filters 4. Eppley Geophysical Observatory.**—*M.R.*

10L–35 551.508.22

Georgi, J., **Blenden-Anordnungen bei Aktino- und Pyrheliometern.** [Shutter arrangements in actinometers and pyrheliometers.] *Germany. Deutscher Wetterdienst. Instrumentenamt Hamburg, Hamburg, Technische Mitteilungen des Instrumentenwesens*, n.s., No. 3:15–21, **1957.** 5 figs. **DWB**—The function of shutters in actinometers and pyrheliometers is discussed. The principle of the "Langley shutter" system is described and the various magnitudes of suitable diaphragm openings in actinometers and pyrheliometers. The diaphragm scheme recommended for use at Davos and the principle of retreating prisms are discussed. *Subject Headings:* **1. Actinometer shutters 2. Pyrheliometer shutters 3. Langley shutter system.**—*I.L.D.*

10L–36 551.524:551.508.2

*Pokrovskaia, I. A., **O peregreve aktinometricheskikh priborov otnositel'no temperatury vozdukha.** [Overheating of actinometric instruments in relation to air temperature.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 61(123):115–119, **1956.** 5 figs., 5 tables. **DWB**—Results of the investigation of the overheating, carried out in June 1952 during the expedition to the Dubovskaia runoff station, are presented. Its purpose was to evaluate differences between the temperature of the instruments and air temperature at great values of radiation intensity, and to compare thermometer readings on the galvanometer and pyrgeometer with the air temperature and actual temperature of the instruments. *Subject Headings:* **1. Instrument temperatures 2. Temperature effects on radiation measurement instruments.**—*A.M.P.*

10L–37 551.508.2

Skeib, Günter, **Über das Verhalten von Strahlungsumsatzmessern im instationaren Zustande.** [The behavior of radiation exchange meters in a nonstationary condition.] *Zeitschrift für Meteorologie*, Berlin, 10(4):97–100, April **1956.** 5 refs., 14 eqs. **DLC**—The theory of radiation measurement has hitherto assumed stationary conditions, but changing ventilation due to gustiness, and varying radiation, may cause extreme instability. Strong artificial ventilation and a large heat capacity minimize these sources of error. *Subject Heading:* **1. Radiation measurement instruments.**—*C.E.P.B.*

10L–38 551.508.2:551.521

Suomi, V. E. (*Univ. of Wisconsin*), **Radiation measurements.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon press, **1957.** Vol. 1:81–82.) **DWB**—A brief outline of the type of radiation measurements made during the Great Plains Turbulence Field Programs and short description of the instrumentation. Measurements were made of (1) solar beam radiation at normal incidence (Abbott Silver Desk Pyrheliometer); (2) direct and diffuse short wave radiation incident upon a horizontal surface with Eppley pyrheliometers; (3) reflected short wave radiation with Eppley pyrheliometers; (4) long and short wave net radiation flux through a horizontal surface (Gier and Dunkle net radiometer) and (5) total long and short wave radiation incident upon a horizontal surface (Gier and Dunkle total hemispheric radiometers). *Subject Heading:* **1. Radiation measurement instruments.**—*I.L.D.*

10L–39 551.508.2:535.345.62

Wörner, H., **Der Reduktionsfaktor für das Strahlungsfilter RG 8.** [The reduction for the radiation filter RG 8.] *Zeitschrift für Meteorologie*, Berlin, 12(1/2):24–26, Jan./Feb. **1958.** 5 refs.

DWB, DLC—The use of red filter RG 8 (thickness 3.0 mm) was recommended for measuring direct solar radiation during the IGY. Owing to the fact that the reduction factor given in the **IGY Instruction Manual** varies between 1.070 and 1.135, the reduction factor was redetermined for the RG 8 filters used in the German Democratic Republic computationally and experimentally (method of SCHUEPP). By calculation the mean value of the reduction factor is $R_s = 1.154$ for an air mass $2(h_\odot = 30°)$ and a vapor pressure of $w = 2.0$ cm H_2O, whereby the wave length 710 nm was selected. At this wave length the deviation at other solar altitudes and vapor pressures occurring in practice amounts at most to 5%. The filtering factors R_s was computed with the actinometer No. 27 of SCHUEPP, for a mean air mass of $m = 2.1$ and a water vapor pressure of $m_k w = 2.0$ cm; namely $R_s = 1.1411 \pm 0.0008$, about 1% below the computed value. The reduction factors were determined in the same manner also with the Michelson-Marten actinometer (no. 519 and 217) provided with RG 8 filters. For MM 519, $R_s = 1.1752 \pm 0.0022$ and for MM 217, $R_s = 1.1477 \pm 0.0028$. *Subject Headings:* **1. Radiation filters 2. Solar radiation measurement techniques.**—*I.L.D.*

10L–40 551.508.2:53.089.6

Wörner, H., **Die Eichung von Strahlungsbilanzmessern und Effektiv-Pyranometern durch Anschluss an Standardgeräte.** [Calibrating radiation balance meters and effective radiation pyranometers by connecting them with standard instruments.] *Zeitschrift für Meteorologie*, Berlin, 12(8):245 248, Aug. **1958.** 2 refs., 19 eqs. German summary p. 245. **DWB, DLC**—Different types of these instruments were compared with one another in Hamburg in 1955 and 1956. The calibration of instruments such as the radiation balance meter requires close control adjustments by standardized instrumentation. Some points to that effect are discussed here, also in relation to radiation pyrometers. *Subject Headings:* **1. Radiation meters 2. Instrument calibration.**—*W.N.*

RADIATION MEASUREMENT INSTRUMENTS (551.508.21)

ACTINOMETERS

10L–41 551.508.41

Canada. Meteorological Div., **Instructions for the operation of the M.S.C. type G bimetal actinograph.** Its *Cir.* 2097, Ins. 36; Manual 80, April 30, **1952.** 9 p. 2 figs. **DWB**—The M.S.C. type G actinograph, which is described and illustrated, is an instrument for measuring total solar and sky radiation received on a horizontal surface, and is designed to give total radiation for the day. At most stations in Canada, the Eppley pyrheliometer is used. This M.S.C. actinograph is a cheaper instrument which can be used to supplement the Eppley pyrheliometer or it can be used where external power is not available. *Subject Headings:* **1. Actinometers 2. Radiation networks 3. Radiation measurement instruments 4. Canada.**—*M.R.*

10L–42 551.508.21

Götz, F. W. Paul and Casparis, Ph. (*both, Lichtklimatisches Observatorium Arosa, Switzerland*), **Zur Methodik des Aktinographen Robitzsch.** [Methodology of the Robitzsch actinograph.] *Naturforschende Gesellschaft, Zurich, Vierteljahrsschrift*, 92(4):239 254, Dec. 31, **1947.** 10 figs., refs. **DLC**—A Robitzsch actinograph has been in use since March 1944 at Arosa Observatory. Problems of calibration and errors, encountered in practical operation are analyzed and their dependence on various factors, such as selective color sensitivity, angle of incidence, dissymmetry of apparatus, etc., is investigated. The instrument is described and illustrated. *Subject Headings:* **1. Robitzsch actinograph 2. Actinograph calibration 3. Actinograph corrections.**—*G.T.*

10L–43 551.508.21

Hinzepeter, Hans, **Zur Eichung der Robitzsch-Aktinographen.** [Calibration of the Robitzsch actinograph.] (In: International Radiation Conference, Davos, Sept. 1956, **Papers. 1956.** [No. 8.] 1 p. Mimeo.) **DWB** (M21.1 161pa)—A new nonlinear scale was developed for actinographs in order to eliminate discrepancies in calibration, resulting from the nonlinear response of actinographs. Preliminary results of the testing of the new scale are reported. *Subject Headings:* **1. Robitzsch actinograph 2. Actinograph corrections 3. Actinograph calibration.**—*G.T.*

10L–44 551.508.21:019.941

Ianishevskiĭ, Iu. D., **Stat'i "Aktinometriia" i "Aktinometr" vo vtorom izdanii Bol'shoi sovetskoĭ entsiklopedii i Sel'skokhoziaistvennoĭ entsiklopedii i sovremennaia aktinometriia v SSSR.** [Article "Actinometry" and "Actinometer" in the second edition of the Great Soviet Encyclopedia and in the Agricultural encyclopedia and contemporary actinometry in the USSR.] *U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby, Informatsionnyĭ Sbornik*, No. 1:155–156, **1951. DLC**—Critical remarks, noting that the definition of the elements of radiation balance is incorrect, and the

information concerning actinometric instruments is not exact. *Subject Headings:* **1. Actinometry 2. Actinometers.**—*N.T.Z.*

10L–45 551.508.21

Krylov, P. A., **Aktinometr Mikhel'sona kak absoliutnyĭ pribor.** [Michaelson's actinometer as an absolute instrument.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 6:552–556, Nov./Dec. **1955.** fig., 4 tables, 10 refs. **DLC**—The transformation of the bimetallic Michaelson actinometer into an absolute instrument (giving readings in calories), while at the same time preserving its constancy, is considered. The recorded modifications of the bimetallic plate (shown on a diagram), the formula relating heating in g calories to current strength voltage and scale division and the calibration of the instrument are discussed. *Subject Heading:* **1. Michaelson actinometer.**—*I.L.D.*

10L–46 551.508.21

Maeda, H., **Variation of the coefficient of Robitzsch-Actinograph.** *Journal of Meteorological Research*, Tokyo, 9(11):836–840, Nov. **1957.** 4 figs., 2 tables, 6 refs., 8 eqs. In Japanese; English summary p. 830. **DWB, DLC**—The author examined the variation of the coefficient of a Robitzsch actinograph by use of Ota-No. 8131 during 1951 and 1952, at Fukuoka, Japan. The principal results are as follows: (1) Frequency distribution of the coefficient is examined, by season. (2) Variation of the coefficient during 1951 and 1952 is presented. (3) Relation between monthly mean air temperature and monthly mean of the coefficient is shown. (4) Relation between the coefficient and the zenith distance is examined. *Subject Heading:* **1. Robitzsch actinograph.**—*Author's abstract.*

10L–47 551.508.21

Sekihara, K. and Kawamura, K. (*both, Met. Res. Inst.*), **An integrating actinometer.** *Papers in Meteorology and Geophysics*, Tokyo, 5(3/4):236–239, Jan. **1955.** 4 figs., table, 2 refs. **DWB**—For meteorological (bioclimatological) purposes, the integrating actinometer of W. W. Coblentz (1947) based on H. C. Rentschler's (1930) instrument which allows a photoelectric current to charge a condenser and periodically discharge into a relay tube that operates a counter is described. An instrument of this type was constructed for use with ac (100 V) power instead of battery (dc) current. The stability of the ac source is greater than that of a battery performance (linear response, errors due to power supply fluctuations and spectral sensitivity were tested and results presented in text and curves). The errors due to power supply were <1%. *Subject Headings:* **1. Integrating actinometers 2. Ultraviolet radiation meters 3. Photoelectric counters.**—*M.R.*

10L–48 551.508.21 551.521.1(474.5)

*Styra, B. I. and Garbaliauskas, C., **Sumarine saules ir dangaus skliauto radiacija Lietuvos TSR teritorijoje.** [Total solar and diffuse radiation for Lithuania.] *Lietuvos TSR Mokslu Akademija Geologijos ir Geografijos Institutas, Moksliniai Pranesimai, Vol. 2, Geofizika*, issued Vilna, **1955.** p. 73–86. 3 figs., 6 tables, 14 refs., 9 eqs. Resumé in Russian p. 84–86.—Global radiation data for Kaunas, Lithuania for 1938–1951 (except for 1941–1943 and 1947) are analyzed and presented in tables and on maps. The Robitzsch actinograph was compared in Feb. 1951 with a standard Gorzynski actinometer at the Geophysical Observatory in Leningrad and appropriate corrections (coeff. 1.018) were made for years when observed values were believed to be too low (1945–50) and a different factor for years 1938–43 (0.844) when values were believed to be too high. A map shows isolines of total annual global radiation for Lithuania based on data for 8 stations (and several in adjacent Latvia) obtained by applying empirical coefficients derived from sunshine duration data. Values range from <84 kcal in the SE (Vilnius) to 93 kcal along the Baltic at the extreme west (i.e. Palanga). Annual curves are given for 8 stations, and tables give data for growing season. *Subject Headings:* **1. Global radiation data 2. Robitzsch actinograph 3. Sunshine duration 4. Lithuania 4. Kaunas, Lithuania 5. Lithuania.**—*M.R.*

Photometers

10L–49 551.508.21:551.521.326:535.33

Bol'shakova, L. G.; Georgievskiĭ, Iu. N.; Otto, A. N. and Rodionov, S. F., **Ob elektrofotometricheskom issledovanii svecheniia nochnogo neba.** [Electrophotometric investigation of the night airglow.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 8:1044–1047, **1958.** 5 figs., 2 refs. **DLC**—With the aid of diagrams the author discusses the design of an electrophotometric apparatus with an automatic recorder for measuring continuously the illumination of the night sky. A light shutter was placed in the opening of a light multiplier; the shutter was open in the working state. Every 10 min the light shutter closed for 40 sec with the aid of a relay system operating on a clock mechanism. The two station method of measuring illumination of the night sky and the possible measurement of the night sky radiation with a monochromator are described. The various

methods employed to obtain correct values and maintain periodic control over such parameters of the electrophotometers, the spectral characteristics, integral sensitivity with particular light filters, and linearity of the entire photoelectric system, are discussed. *Subject Headings:* **1. Electrophotometers. 2. Night airglow measurement techniques.**—*I.L.D.*

10L–50 551.508.21:551.521.326

Link, František; Neužil, Ludek and Zacharov, Igor (*all, Astronomical Inst., Czech Academy of Sciences, Ondrejov*), **Photomètres du ciel nocturne en service aux stations Tchécoslovaques de l'AGI 1957–1958.** [Night sky photometers in use at Czechoslovak stations for the 1957–1958 International Geophysical Year.] *Studia Geophysica et Geodaetica, Prague,* 1(2):302–309, **1957.** 4 figs., 4 refs., 19 eqs. **DWB**—During the IGY 1957–1958, a special photometer was used at two Czechoslovak stations (Ondrejov, 49.9°N, 14.8°E, 528 m, and Lomnicky Stet, 49.2°N, 20.2°E, 2634 m). The instrument could be used at the zenith. At seventeen zenithal distances, three emissions of 5577, 5893, 6300 Å were studied from five spectral regions. Two emissions of 5300, 6100 Å were observed, also. The manipulation of this instrument and the steps to be followed during its use are discussed in this article. The essential characteristic of this instrument is its stability and measurements by these night sky photometers are reliable. *Subject Headings:* **1. Night sky photometers 2. Czechoslovakia.**—*N.N.*

10L–51 551.508.21:551.521.16

Sauberer, Franz (*Zentralanst. f. Met. & Geodyn., Vienna*), **Meteorologische Lichtmessungen in Wien: ein messtechnischer Erfahrungsbericht.** [Meteorological light measurements in Vienna: a report on measurement techniques.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B,* Vienna, 9(2):164–184, **1958.** 6 figs., 2 tables, 18 refs. German, English and French summaries p. 164–165. **DWB, DLC**—After a brief survey of the development of the techniques of meteorological light measurements in Vienna and in Austria, method, installation of instruments, and calibration method of the records of global illumination made in Vienna since 1937 are described. The results are given, by comparison with a Weber photometer, in Hefner-lux. The selenium photoelectric cells in use are provided with filters to adapt them to the spectral sensitivity of the human eye. The results of the records of the years 1946–1956 are given in the form of daily variations for cloudless and covered sky as well as in the form of averages of all observation days and of daily totals of global illumination in kiloluxhours. The instruments used and the calibration method are discussed critically. Photoelectric cells of various firms were tested as to their spectral sensitivity and showed partly noticeable differences. The temperature effect is particularly inconvenient. Some cells were studied with a view to the temperature influence on the photoelectric current. Certain types were less, and others more influenced by temperature variations. It is recommended, therefore, that every photoelement be tested individually if exact records are required and if there is no possibility of securing an approximately constant temperature by thermostats. The new silicon photoelements have no advantage in comparison with selenium cells, because of the displacement of the sensitivity maximum into the infrared range with adaption to the sensitivity curve of the eye. *Subject Headings:* **1. Light measurement techniques 2. Global radiation measurement techniques 3. Photometers.**—*Author's summary.*

Pyranometers

10L–52 551.508.21

Dirmhirn, Inge (*Vienna*), **Einfache Sternpyranometer.** [A simple star pyranometer.] *Wetter und Leben,* Vienna, 6(5/6):132–135, Aug. **1954.** 2 figs., 2 tables, 4 refs.—The instrument consists of 36 small copper plates to the underside of which is soldered the thermocouple of chrome-nickel constantan. The copper plates are arranged in three rings upon three rings constructed of bent insulating material. A detailed description of the calibration relativity and operation of this instrument and a comparison of data obtained with a solarimeter are presented. A photograph of the instrument is reproduced. *Subject Headings:* **1. Pyranometers 2. Pyranometer calibration.**—*I.L.B.*

10L–53 551.508.21

*Kacvinská, Katarína, **Pyranometrické merania na Slovensku roku 1951.** [Pyranometer measurements in Slovakia in 1951.] *Meteorologické Zpravy,* Prague, 5(5):117–122, **1952.** 2 figs., 6 tables, 5 refs. Review by J. Paszynski, in *Przeglád Meteorologiczny i Hydrologiczny,* Warsaw, 7(1/2):86–87, **1954. DLC**—Global radiation measurement in Slovakia was started in 1951 at four stations by means of Bellani type bulb pyranometers. The instrument is described and illustrated and its operation explained. Data on sunshine duration (1901–1940 and 1951), monthly and annual totals of global radiation (1951), monthly means and extremes, and daily frequency distribution of global radiation values for each month (1951) are presented. The four stations for which global

radiation values are available are: Bratislava, Hurbanovo, Turčianský Svätý Peter (incomplete record) and Košice. *Subject Headings:* **1. Global radiation measurement instruments 2. Bellani pyranometer 3. Global radiation data 4. Slovakia.**—*G.T.*

10L–54 551.508.21

Wörner, H., **Eine neue Ausführung des Kugelpyranometers Bellani.** [A new development of the Bellani sphere pyranometer.] *Zeitschrift für Meteorologie*, Berlin, 10(3):65–75, March **1956.** 8 figs., 5 tables, 5 refs., 5 eqs. **DLC**—A modification of the Bellani-Henry distillation pyranometer is briefly described. It integrates daily radiation to an accuracy of ±10%. A number of calibration tests for alcohol and water filling, blue and black glass, etc. are illustrated. Calibration depends on cloudiness; the response appears to increase with partially clouded sky and decrease with overcast. The total radiation on a sphere is compared with that on a horizontal surface, the ratio averaging about 2.3 but decreasing with increasing radiation. *Subject Headings:* **1. Bellani pyranometer 2. Global radiation measurement instruments.**—*C.E.P.B.*

Pyrgeometers

10L–55 551.508.21

Kopáček, Jaroslav and Sobíšek, Bořivoj, **Vlastnosti konstanty Angströmova kompensačního pyrgeometru.** [Properties of the element of the Ångström compensating pyrgeometer.] *Meteorologické Zprávy*, Prague, 8(5):117–123, **1955.** 6 figs., 3 tables, 4 refs., 3 eqs. Russian and German summaries p. 117. **DWB**—Calibration of an Ångström compensating pyrgeometer is described and results of calibration measurements are reported. The effect of a decrease of instrument temperature on discrepancies between the zero points on the galvanometer and on the pyrgeometer, and corresponding changes in the measuring element are discussed. A method of pyrgeometer measurement is advanced for cases of such discrepancy between the zero points. *Subject Headings:* **1. Ångström compensation pyrgeometer 2. Pyrgeometer calibration.**—*Transl. of authors' abstract.*

10L–56 551.508.21

Kuwana, J., **A measuring instrument for atmospheric radiation.** *Tateno, Japan. Aerological Observatory, Journal*, 5(3):189–198, March **1954.** 6 figs. In Japanese; English summary p. 189. **DLC**—A pyrgeometer for routine work was designed and constructed; its schematic diagram is presented. The receiver is a thermopile of 10 pairs of copper constantan junctions supported on one end of a blackened cylinder. The thermopile and the cylinder are kept at a constant temperature by means of a thermostat which consists of a thermistor bridge, a dc amplifier for error voltage, a relay and a heater. By this device temperature fluctuation could be kept within less than 1/100°C. The standardization of the instrument was made by hollow space radiator. In this paper the hollow space radiator, the thermostat and the amplifier used for this apparatus are described in detail. *Subject Heading:* **1. Pyrgeometers.**—*Author's abstract.*

Pyrheliometers

10L–57 551.508.21

*Davis, P. A. (*Geophysics Research Directorate*), **Eppley pyrheliometers.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:83–86. fig., 2 tables, 3 refs.) **DWB**—The operational characteristics of the Eppley pyrheliometer used in the Great Plains Turbulence Field Program, the results of calibration of the Eppley pyrheliometer, a post operational laboratory check of the Speedomax recorder are discussed and the results of a laboratory investigation of the errors to which the Eppley pyrheliometer is subject (K. Buettner and D. Fuquay) are outlined. Tables giving total incoming short wave radiation, reflected short wave radiation and albedo and Eppley pyrheliometer recordings after 1 min shadings are presented. *Subject Headings:* **1. Eppley pyrheliometer 2. Pyrheliometer calibration 3. Great Plains Turbulence Field Program.**—*I.L.D.*

10L–58 551.508.21 551.521.1

Dogniaux, R. and Pastiels, R., **Techniques modernes de mesure de l'éclairement énergetique solaire.** [Modern techniques for measuring solar illumination energy.] *Belgium. Institut Royal Météorologique, Publications, Ser. B*, No. 16, **1955.** 49 p. 22 figs. (incl. photos), 19 refs. **DLC, DWB**—A critical comparison of pyrheliometers is made, actinometric measurements are discussed, and different solarimeters and solarigraphs are compared. Potentiometers and automatic integrators are used to measure solar radiation continuously. Finally it is shown how to present the

results and how to determine the solar climate by sunshine duration. *Subject Headings:* **1. Solar radiation measurement 2. Pyrheliometers 3. Solar radiation measurement instruments 4. Royal Observatory, Uccle, Belgium.**—*A.A.*

10L–59 551.508.21:551.501.3:551.521.12

Drummond, A. J. (*Radiation Service, South African Weather Bureau*), **The international scale of radiation.** *World Meteorological Organization, WMO Bulletin*, 5(2):75–78, April **1956. DWB**—The history of the Ångström and Abbot pyrheliometers, their relative merits and extent of use of each in the several continents, and a recommendation that one or the other scale, or an arithmetic mean of the two be used provisionally as an International Standard as soon as possible, are presented in this informative paper. The Ångström scale is closer to the present theoretical absolute scale, but the revised (1952) Smithsonian scale is quite close. Confusion in presentation of radiation data is now great—even in one region (Africa) the two scales are employed indiscriminately among the several countries in the same volume of published data. *Subject Headings:* **1. International Radiation Scales 2. Pyrheliometer scales 3. Ångström pyrheliometer 4. Abbot pyrheliometer.**—*M.L.R.*

10L–60 551.508.21

Fuquay, Don and Buettner, Konrad (*Dept. of Met. & Climat., Univ. of Wash., Seattle, Wash.*), **Laboratory investigation of some characteristics of the Eppley pyrheliometer.** *American Geophysical Union, Transactions*, 38(1):38–43, Feb. **1957.** 4 figs., table, 20 refs., 7 eqs. **DWB, DLC**—The Eppley pyranometer shows the following deviations of its scale value: (1) The temperature coefficient consists of coefficients of the thermopile and of the different heat exchange parameters. (2) Air convection within the glass bulb causes a dependency of the scale value on the angle between the receiving surface and the direction of gravity. (3) Rays from below the instrument plane may be reflected by the glass ball onto the receiving surface. (4) The existing black paint has a specular reflection which causes a dependency on the angle of incidence. All deviations can be brought under control by suitable modification or calibration. *Subject Headings:* **1. Eppley pyrheliometer 2. Eppley pyrheliometer calibration.**—*Authors' abstract.*

10L–61 551.508.21:551.501.3

Ivanishevskiĭ, Iu. D., **Mezhdunarodnaia pirgeliometricheskaia shkala 1956 goda.** [International pyrheliometric scale of 1956.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:46–47, June **1958. DWB, DLC**—The differences in the solar constant as measured on the improved Ångström scale, and on the Smithsonian scale which is based on the improved water flow pyrheliometer, and the solution of the problem of the representativeness of the compensating pyrheliometer No. 140 of the Potsdam Observatory examined at the International Conference on Radiation held at Davos in 1956 are discussed. In order to convert to the International Pyrheliometric Scale it is necessary (1) to increase by 1.5% the transfer factor of all pyrheliometers, actinometers, pyranometers and balance meters which were verified according to pyrheliometers of the Central Geophysical Observatory after their verification at Potsdam, i.e., beginning with 1953; (2) to increase by 1.5% the results of actinometric observations made since Jan. 1957 with the apparatus just mentioned; (3) and not to change the factor of the apparatus obtained during their verification at the Central Geophysical Observatory, 1942–1952. *Subject Heading:* **1. International Pyrheliometric Scale, 1956.**—*I.L.D.*

10L–62 551.508.21

Kunii, K., **Note on the pyrheliometer.** *Journal of Meteorological Research*, Tokyo, 8(11):735–736, Dec. **1956.** 3 figs., 3 refs. In Japanese. **DWB, DLC**—The Kunii type pyrheliometer is a galvanometer-attached thermocouple thermometer, whose two ends are connected to brass plates painted white and black each. The reading unit (unit gradient on gage) of the Robitzsch pyrheliometer is approximately equivalent to 10 units of galvanometer reading (mv) of the Kunii type. *Subject Headings:* **1. Pyrheliometers 2. Kunii pyrheliometer.**—*Jay Woo.*

10L–63 551.501.3:551.521.12

Lindholm, F. (*Swedish Met. and Hydrological Institute, Stockholm*), **On the Ångström absolute pyrheliometric scale.** *Tellus*, Stockholm, 10(2):249–255, May **1958.** 4 figs., 2 tables, 17 refs., eqs. **DWB, DLC**—A critical examination of the original Ångström pyrheliometric scale has been made from results of the recent calibration of the new modified Ångström pyrheliometer using the sun as radiation source. The mean marginal error of the old standard pyrheliometer is found to be 2.4%. It is estimated that the small difference in aperture of the two models increases the correction insignificantly. This result means that the original scale values with the addition of 2.4%, are given in the true energy scale. The corrected values are nearly 1% higher than in the pyrheliometric scale recommended by the Radiation Conference at Davos, 1956. A practical pyrheliometric standard scale is a question of specifying the aperture conditions, or the amount of circumsolar sky radiation to

be allowed in the standard pyrheliometer. Such a specification is proposed and recommended b the Conference at Davos. *Subject Heading:* **1. Angström pyrheliometric scale.**—*Author's abstract.*

10L–64 551.508.21:551.521.1

Shul'gin, V. M., **Ob aktinometricheskoĭ shkale.** [The actinometric scale.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:51–55, April **1957.** 3 figs., 2 tables, 20 refs. **DWB, DLC.** Englis transl. available **DWB** (M21.12 S562on)—The measurement of the solar constant by the methods o Ångström, Abbot and V. A. Mikhel'son (Russia) are discussed briefly and critically. It is pointe out in Abbot's instruments "Standard No. 2" and "Standard No. 3" that the temperature tendenc of the water stream was not eliminated. The author describes a method of improving the wate stream method of Abbot by eliminating a longitudinal distribution of temperature in a water stream The new method consists of a tube with a stream of water. The tube forms two branches. If bot branches are similar then the streams of water from the main tube will branch into similar column and both tubes will operate synchronously. If one of the tubes is heated by the sun, its temperatur is raised; this temperature difference is measured by a galvanometer. The synchronous state of th tubes results from the absence of turbulence and from the fact that the water is directed in paralle coaxial layers. By placing the branched current in a calorimeter the problem of constructing pyrheliometer is solved. Two variations of this pyrheliometer are described. The results of testin these two models with Lenz-Joule heat are presented in a table and compared with the heat tes according to Abbot. It is shown that the percentage of heat obtained never exceeds 100% as in th case of Abbot's measurements. According to measurements with this apparatus it is shown tha the Smithsonian value of the solar constant is 2.3 2.5% too high. The U. S. Standard No. 5 i criticized for not taking into consideration all the modifications introduced by the author. *Subjec Headings:* **1. Solar constant measurement techniques 2. Pyrheliometers.**—*I.L.D.*

10L–65 551.508.21

Sweden. Meteorologiska och Hydrologiska Institut, **Compensation pyrheliometer of K Angström.** Its *Instruction Manual*, No. 2, **1957.** 9 p. 5 figs. (incl. photos), 7 refs. **DWB** (M(055) S974ins)—The description, installation and circuit connections, the theory and operation of the compensating pyrheliometer of K. Ångström is presented. By this instrument the intensity o solar radiation per sec per cm² can be expressed simply by the equation $I = K \cdot i^2$, where I = the intensity; K = the pyrheliometric constant and i = the heating current. This simple equation replaces a former one which was somewhat involved. *Subject Headings:* **1. Ångström pyrheliometer 2. Solar radiation intensities.**—*N.N.*

10L–66 551.508.21

V'iushkov, P. V. and Ridel', E. A., **O bolometricheskom pirgeliometre dlia absoliutnykh izmerenii priamoi solnechnoi radiatsii.** [Bolometric pyrheliometer for absolute measurements of direct solar radiation.] *Astronomicheskii Zhurnal*, Moscow, 34(3):490–492, May/June **1957.** 2 figs., 4 refs., eq. English summary p. 490. **DLC.** Transl. into English (photostat of typescript) available **DWB** (M08.21 V998bo)—A pyrheliometer based on the bolometric principle is described. Solar radiation is received by a plane single layer coil. The bolometric pyrheliometer has several advantages in comparison with the Ångström compensation pyrheliometer. Preliminary investigations show a satisfactory agreement between the results of measurements. The instrument can be used for absolute determinations of solar radiation.—*Subject Headings:* **1. Pyrheliometers 2. Solar radiation measurement instruments.**—*Authors' abstract.*

Pyrometers

10L–67 551.508.21

Kamiyama, K.; Moriguchi, M. and Eguchi, M., **The way to measure the surface temperature through Pb S-photoconductive cell.** *Papers in Meteorology and Geophysics*, Tokyo, 3(3):217–221, Jan. **1953.** 2 figs., 4 refs. **DWB**—A pyrometer which was built for the measurement of comparatively low temperatures is described. The detector of the radiation is the recently developed PbS cell, and the amplifier system was specially designed for this purpose. *Subject Headings:* **1. Pyrometers 2. Radiation pyrometers.**—*Authors' abstract.*

10L–68 551.508.21 536.52

Vollmer, J.; Duke, J. and Wysocki, C. (*all, Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Phil.*), **High-speed radiation pyrometer.** *Optical Society of America, N. Y., Journal*, 46(3):215–217, March **1956.** 4 figs., ref., 6 eqs. **DWB, DLC**—A high speed option for a time tested radiation pyrometer has been made available. The response time for 98% response is less than or equal to 0.5 sec. It is compensated for ambient temperature effects, is transient free, and makes use

of existing charts and scales when used with null-balance electronic potentiometers. *Subject Heading:* **1. Pyrometers.**—*Authors' abstract.*

Solar Radiation Measurement Instruments

10L–69 551.508.21:535.24

Bener, P. **Erfahrungen mit Cadmium-Zellen und Vorschläge für die Weiterentwicklung von Instrumenten zur Messung der UV B-Strahlung von Sonne und Himmel.** [Experiments with Cadmium cells and suggestions for the further development of instruments for measurement of the UV B-radiation from sun and sky.] (In: International Radiation Conference, Davos, 1956, **Papers.** Pub. **1956** [No. 2] 20 p. 2 tables, 14 refs. Mimeo.) **DWB** (M21.1 (61pa)—As a result of recalibration of photoelectric cadmium cells after being in use for 2–4 yrs, Davos Observatory revealed the lack of stability of such instruments. It does not appear likely, however, that expensive efforts will be made to develop more reliable special cells, as the present accuracy is sufficient for general purposes of radiation climatology. *Subject Headings:* **1. Solar radiation measurement instruments 2. Photoelectric cells 3. Davos Observatory.**—*G.T.*

10L–70 551.508.21:535.24

Blet, Georges, **Modifications de la courbe de sensibilité spectrale des photopiles au sélénium sous l'action des variations de température.** [Modification of the spectral response curve of selenium photocells by temperature variations.] *Académie des Sciences, Paris, Comptes Rendus,* 242(1):95–98, Jan. 4, **1956.** 5 figs. **DLC**—Detailed curves of sensitivity or response of selenium photocells to temperature in the range from air temperature (300°K) to that of liquid helium are presented and discussed for visible wave lengths (0.4 to 0.8μ). The sensitivity decreases as the temperature decreases, for any given wave length, and the decrease is more marked in the short wave lengths. The maximum sensitivity occurs at .55 and a second maximum at 0.70μ. Different responses occur when the cells are reheated or recooled and the effect of time is significant. *Subject Headings:* **1. Temperature effects on selenium photocells 2. Photoelectric cells.**—*M.R.*

10L–71 551.508.21

*Lossnitzer, H. (*Met. Obs. Freiburg i. Br.*), **Ergebnisse von Interferenzfiltermessungen der Sonnenstrahlung von 350 bis 1000 nm.** [Results of interferential filter measurements of solar radiation from 350 to 1000 nm.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B,* Vienna, 9(1):73–79, **1958.** fig., 6 tables. German, English and French summaries p. 73–74. **DLC**—The author presents a critical study of actinometric measurements of solar radiation with interference filters, carried out at the Freiburg/Br. Observatory. The measured values verify well known facts on the reaction of solar radiation in its different spectral regions to variations of the sun's elevation, the atmospheric turbidity and the altitude of the place of observation. The efficiency and the sensitiveness of the measuring method are discussed. The technical assumptions required to obtain the Ångström turbidity parameters for some nearly monochromatic spectral regions from measurements with interference filters seem to be attainable, although not yet sufficient. *Subject Headings:* **1. Solar radiation measurement techniques 2. Solar radiation measurements 3. Interference filters 4. Freiburg in Breisgau Observatory, Germany.**—*Author's abstract.*

10L–72 551.508.21

Ward, G. T. (*Univ. of Calif., Berkeley*), **Evidence for the need of a cheap simple solar radiation recorder.** *Solar Energy,* Phoenix, Arizona, 2(3/4):34–36, Oct. **1958.** ref. **DWB**—The recording of solar radiation data in eight tropical countries is surveyed. The author urges the development of an inexpensive solar radiation recorder with an accuracy of $\pm 5\%$ which would provide reliable data for engineers and agriculturalists. *Subject Heading:* **1. Solar radiation recorders.**—*Author's abstract.*

10L–73 551.508.21

Wegener, Kurt, **Zur analyse der Beobachtungen der Sonnenstrahlung.** [Analysis of solar radiation observations.] *Geofisica Pura e Applicata,* 18:155–157, **1950.** fig. **DLC**—The author has constructed an instrument for measurement of solar radiation consisting of 2 black (mercury) thermometers which are calibrated to 150°C. One thermometer measures the direct temperature of solar radiation and the other the temperature on the backside of a separating partition. A parabolic mirror concentrates the sun's rays on the mercury tube. Total cost of material was <100 pesos. By partial covering of the parabolic mirror, the temperature of the exposed thermometer can be brought down to near the value of the shaded one. Care must be taken to have both bulbs exposed to similar secondary radiation (albedo, cloud radiation, etc.). An example of graphical measurements made on 2 different days at Pilar in 1950 is presented. *Subject Heading:* **1. Solar radiation measurement instruments.**—*M.R.*

SUNSHINE RECORDERS (551.508.23)

10L–74 551.508.22

de Boer, H. J., **[Difference between national instructions for measuring the cards of the Campbell-Stokes sunshine-recorder.]** (In: International Radiation Conference, Davos, Sept. 1956 **Papers. 1956.** [No. 3] 2 p.) Mimeo. **DWB**—An example is given showing the differences in sunshine duration values obtained from the same data by following Dutch and German instructions respectively (the latter always yield higher results.) *Subject Heading:* **1. Campbell-Stokes sunshine recorder.**—*G.T.*

10L–75 551.508.23

Kauf, Helmut, **Zur Verwendung von Kungstoffen als Kugellinsen fur Sonnenscheinautographen** [Use of plastic material for spherical lenses of sunshine recorders.] *Zeitschrift für Meteorologie* Berlin, 12(8):243–244, Aug. **1958.** 4 tables. **DWB, DLC**—An optical glass lens (d∼96 mm) cost about 200 German Marks, hence the experimentation with Piacryll plastic was worthwhile from the outset. It shows by comparison that plastic lenses are quite satisfactory, and each one costs only 42 German Marks. *Subject Heading:* **1. Sunshine recorders.**—*W.N.*

10L–76 551.508.23

Liana, Franciszek, **Heliograf z wirującą soczewką.** [Heliograph with a revolving lens.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 8(2):135–136, **1955.** 2 figs., ref. French summary p. 136. **DWB, DLC**—The newly designed heliograph is composed of a double convex lens (fronta distance =250 mm). A small electric motor makes the lens turn every 60–100 sec. The solar rays concentrated twice during one revolution of the lens, burn a trace on the cardboard band placed in a metal frame. *Subject Heading:* **1. Sunshine recorders.**—*A.M.P.*

10L–77 551.508.23

Rossi, Veikko (*Met. Zentralanstalt, Helsinki*), **Sonnenscheinautograph ohne Rauhreifbildung** [Sunshine recorder without rime formation.] *Geophysica*, Helsinki, 4(4):231–232, **1954.** 2 figs. **DWB**—In order to avoid hoar frost formation on sunshine recorders at Ilmala, Finland, or the trouble of taking the instrument indoors every night, a hole was made in the base of the instrument and a 10 w electric light instailed. This lamp warms the glass ball and prevents frost on the glass sphere and on the metal recorder as well, and makes records more accurate. *Subject Headings:* **1. Sunshine recorders 2. Frost prevention on sunshine recorders 3. Ilmala, Finland.**—*M.R.*

10L–78 551.508.23

Simonov, Ia. P. and Shumeĭko, V. P., **Ob universal'noĭ modeli geliografa.** [Universal model of the heliograph.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:49, July/Aug. **1955. DWB**—The deficiencies of the universal model of the heliograph are cited. The ribbon must be changed several times daily; it is more difficult to operate, etc. Its disadvantages in Arctic stations are stressed. *Subject Headings:* **1. Sunshine recorder deficiencies 2. Sunshine recorders.**—*I.L.D.*

MISCELLANEOUS (551.508.25)

Cosmic Ray Measurement Instruments

10L–79 551.508.25

Kodama, Masahiro; Murakami, Kazuaki; Takeuchi, Hajime and Miyazaki, Yukio, **On the standard cosmic-ray neutron monitor.** *Tokyo. Scientific Research Institute, Journal*, 51:37–53, June **1957.** 21 figs., 3 refs. Also: Kamata, Koichi and Sasaki, Fukashi, **Parametron and punched card recorder for the standard meson monitor.** *Ibid.*, p. 54–68. 12 figs. Also: Kawasaki, Shinkichi; Kondo, Ichiro; Wada, Masami and Miyazaki, Yukio, **On the standard cosmic-ray meson monitor.** *Ibid.*, 51:107–137, Sept. **1957.** 37 figs., 4 tables, 10 eqs., 18 refs. **DLC**—These papers contain comprehensive descriptions, with detailed block diagrams and photographs, of the cosmic ray equipment recently installed and now operating continuously at the Mt. Norikura Cosmic Ray Laboratory. The monitor units have been designed in accordance with internationally accepted specifications. Measurements are automatically recorded on punched cards every 15 min. *Subject Headings:* **1. Cosmic ray measurement instruments 2. Cosmic ray research 3. Mt. Norikura Cosmic Ray Laboratory, Japan.**—*G.T.*

10L–80 551.508.25:551.521.64

Parsons, N. R. (*Antarctic Div., Dept. of External Affairs, Melbourne*), **Zenith angle sensitivity of a cubical meson telescope.** *Review of Scientific Instruments*, Lancaster, N. Y., 28(4):265–266,

April **1957.** 2 figs., 5 eqs. **DWB, DLC**—An examination in some detail is made of the relative directional sensitivities of the vertical and inclined Geiger counter telescopes in use in connection with the program of continuous registrations of cosmic ray intensity being carried out at Hobart and at the Australian National Antarctic Research Expedition stations at Macquarie Island and Mawson, Antarctica. Calculations have been made for the simple case of a vertically directed cubical meson telescope of the type adopted as standard equipment by many stations for the IGY. Graphs give 1) the variation of relative sensitivity with zenith angle for a vertically directed cubical meson telescope indicating that the telescope sensitivity is a maximum at zenith angle 18.4°; 2) the cumulative sensitivity diagram for a vertically directed cubical meson telescope, from which may be read directly the percentage of the total radiation recorded, which is incident from zenith angles less than any particular value. *Subject Headings:* **1. Cosmic ray intensity measurement instruments 2. Meson telescopes.**—*N.N.*

Polarimeters

10L–81 551.508.93:551.593.7

Akabane, Kenji (*Tokyo Astronomical Obs., Univ. of Tokyo, Japan*), **A polarimeter in the microwave region.** *Institute of Radio Engineers, N. Y., Proceedings,* 46(1):194–197, Jan. **1958.** 7 figs., 3 refs., 8 eqs. **DLC**—A polarimeter at the frequency of 9000 Mc for the observation of solar radio emission is described. The method of phase modulation at the rf circuit is applied to detect the polarized components in the incident waves. The amplitude modulation by ferrite switching also is used to get higher accuracy for the observation. The Stokes parameters (I, Q, U, and V) in a partially incident wave can be obtained directly. The minimum detectable intensities of these parameters are 3 for I, $Q/2$ and V, and 6 for Q and U respectively in units of 10^{-22} mks. An example of the observation shows the complex polarization of a solar radio burst at this frequency. *Subject Headings:* **1. Polarimeters 2. Solar radio emission observation.**—*Author's abstract.*

10L–82 551.508.93:551.593.7

Benner, A. H. and Nearhoof, H. J. (*Pa. St. Coll. Radio Propag. Lab.*), **Low frequency polarimeter.** Pennsylvania. State College. Radio Propagation Laboratory, Contract AF 19(122)-44, Basic Ionospheric Research, Technical Report No. 16, Oct. 25, **1950.** 13 p. 23 figs., 6 refs. **DWB**—The polarimeter, for operation with a pulsed system (150 kc/s, pulse rate 1.5625 pps) designed to receive and record ionospheric echoes is shown in block form. Some initial experimental results are presented. *Subject Heading:* **1. Polarimeters.**—*W.N.*

10L–83 551.508.93:551.593.7

Bouriau, Y. and Lenoble, J., **Projet d'un polarimètre pour l'étude du rayonnement ultraviolet du ciel.** [Polarimeter project for the study of the ultraviolet sky radiation.] *Revue d'Optique,* Paris, 37(3):131–146, March **1958.** 6 figs., table, 12 refs. **DLC**—After surveying the various methods used to determine low degrees of polarization in ultraviolet light, a photoelectric polarimeter is described. The polarized part of the radiation is modulated by means of a rotating birefringent plate and a fixed polarizer. A monochromator selects a narrow wave length range that is received on a photomultiplier. The modulated current given by the photomultiplier is measured by a selective amplifier and an electronic millivoltmeter. The null current is obtained by depolarizing the incident light with a compensator plate. *Subject Headings:* **1. Polarimeters 2. Ultraviolet sky radiation.**—*Authors' abstract.*

Radiation Balance and Infrared Measurement Instruments

10L–84 551.508.25:551.521.18

Aagard, Roger L. (*Univ. of Minnesota*), **Convection free instrument for measuring infrared radiation in the atmosphere.** *Review of Scientific Instruments,* N. Y., 29(11):1011–1016, Nov. **1958.** 6 figs. (incl. photo), foot-refs., 8 eqs. **DLC**—The instrument described is a null type device which measures the equivalent blackbody radiation temperature in the atmosphere at night by supplying electrical power to the absorber surface to replace the net loss of energy by radiation and keep the surface at the ambient air temperature. Thus convection effects are eliminated. A thermopile is used to detect the absorber surface temperature difference from air and provide a signal to the high gain transistor dc amplifier of the servosystem. Apparatus is also described which was useful in the development of the instrument and in verifying its theoretical calibration. *Subject Heading:* **1. Infrared radiation meters.**—*Author's abstract.*

10L–85 551.508.25:551.324.414

Ambach, W., **Ein Strahlungsempfänger mit kugelförmiger Empfängerfläche zur Bestimmung des Extinktionskoeffizienten in Gletschern.** [Radiation receiver with spherical receiving surface for

determining the extinction coefficient in glaciers.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 8(3/4):433–441, **1957.** 4 figs., table, 11 refs., 2 eqs. **DLC**—A radiation receiver with a spherical surface was constructed to determine the extinction coefficient of the total radiation in a glacier. This coefficient is important in connection with the inner ablation of the glacier. The apparatus, since it has an aperture angle of 4π, guarantees a uniform absorption of the diffuse radiation, as well as the direct radiation from all directions. Its sensitivity when connected with a Kipp mirror galvanometer is large enough to carry out measurements within the glacier to a depth of 200 cm. In principle the apparatus is a thermocouple consisting of Vacoplus thermo constantan, the soldered joint of which measures the relatively higher temperature of a lead sphere (4 mm in diameter). Equations for determining optimum dimensions of the apparatus are presented. At different depths within the glacier where measurements were made (20–170 cm) an extinction coefficient of the global radiation of 0.0150/cm–0.0180/cm was found. The coefficient is independent of depth and confirms the exponential absorption for total radiation. *Subject Headings:* **1. Radiation measurement instruments 2. Extinction coefficient of glaciers.**—*Author's summary and I.L.D.*

10L–86 551.508.25:551.521.18

Bolle, Hans Jürgen and Fleischer, Richard, **Der Einfluss der Lupolen-Absorption auf die Messung und Registrierung der Ultrarot-Strahlungsströme.** [Influence of lupolen absorption on the measurement and recording of infrared radiation flux.] *Annalen der Meteorologie*, Hamburg, 6(11/12):380–381, **1953/1954.** fig., 7 refs. **DWB, DLC**—Schulze's radiation balance meter is covered with a lupolen-M cover for protection against weather. A comparison of the optical transparency of this cover with the atmospheric back radiation shows that for a first approximation the 0.1 mm thick lupolen cover does not affect the results of measurements. *Subject Headings:* **1. Infrared radiation meters 2. Infrared radiation measurement.**—*A.A.*

10L–87 551.508.25

Lowry, William P. (*Oregon State Board of Forestry, Salem, Oregon*), **An inexpensive field instrument for non-selective net radiation measurements.** *Ecology*, Durham, N. Carolina, 38(1):152–155, Jan. **1957.** 3 figs., table, 6 refs. **DWB**—Principle, construction details, calibration, and results of field test of a nonselective net radiometer to be used with an Eppley pyrheliometer are outlined and field tests of performance shown graphically. The instrument is simple and not too sensitive but is sufficient for biological and geophysical research in the field. Two mercury thermometers are mounted on each side of a blackened metal plate. Calibration data are tabulated and procedures illustrated schematically and graphically. *Subject Heading:* **1. Radiation measurement instruments.**—*M.R.*

10L–88 551.508.25

Mörikofer, W. (*Davos, Switzerland*), **The determination of the radiation balance of the earth.** *International Union of Geodesy and Geophysics. Association of Meteorology, Brussels, 1951, Procès-Verbaux des Séances*, pub. **1954.** p. 207–215. 3 refs. **DWB**—Historical review of radiation meters and general description of a new radiation balance meter developed by the author's collaborators, Courvoisier and Wierzejewski. The new instrument has strong artificial ventilation in order to eliminate the effect of wind variations. *Subject Headings:* **1. Radiation meters 2. Radiation balance meters.**—*A.A.*

10L–89 551.508.25:551.521

*Sauberer, F. (*Vienna*), **Über die Strahlungsbilanz verschiedener Oberflächen und deren Messung.** [Radiation balance of different surfaces and its measurement.] *Wetter und Leben*, Vienna, 8(1/2):12–26, **1956.** 2 figs., 5 tables, 20 refs. **DLC**—The author discusses various attempts made by him to measure radiation balance directly and to determine the long wave fraction of the radiation exchange by means of a radiation balance meter. The interaction of the individual components of radiation balance is discussed with the aid of numerical data. Tables giving daily totals of solar, sky and global radiation, daily totals of counter radiation as a function of sunshine duration and height above sea level in the Alps and as a function of geographic latitude and sunshine duration are presented. The theory and operation of the radiation balance meter constructed by F. Albrecht at the Zentralanstalt für Meteorologie und Geodynamik at Vienna, radiation balance studies carried out by Falkenberg, P. Courvoisier, etc., are discussed and the principal difficulties encountered in the measurement of radiation balance are listed and analyzed. *Subject Headings:* **1. Radiation balance measurements 2. Radiation balance meters 3. Alps.**—*I.L.D.*

10L–90 551.508.25:551.521.18

Evapograph. *Science*, 123(3193):410–411, March 9, **1956. DWB, DLC**—A new camera-like instrument EVA (evapograph) using no electronic currents, enables one to see a house a mile away on a pitch black night. It collects infrared radiation from the object and focuses it on an oil film, which

evaporates at varying rates depending on the amount of radiation received at each point. The differences can be viewed as different colors, in reflected light, and can detect radiation from 0 to several thousand degrees F, and is sensitive to 0.2°. Temp. measurements can be made from the image, either visually or photographically. It is contained in a cabinet 18×14×11 in. A dozen have been built at $9500 each. The instrument was developed at Wright Field by the U. S. A. F. and Signal Corps. *Subject Headings:* **1. Evapograph (EVA) 2. Infrared detectors 3. Temperature detectors.**—*M.R.*

Radioactivity Measurement Techniques

10L–91 551.508.25:550.9:539.16:546.26

Ballario, C.; Beneventano, M.; De Marco, A. et al. (*Natl. Nuclear Physics Inst., Rome Univ.*), **Apparatus for carbon-14 dating.** *Science*, 121(3143):409–412, March 25, **1955.** 2 figs., 6 refs. **DLC**—The method used by W. F. Libby et al. to measure elementary carbon is used along with modified techniques of preparing radiochemically pure carbon. A new technique of measuring the radioactivity of the C^{14} isotope with a 4-element counter is described in some detail and outlined in block diagrams. Sample measurements were made of a piece of wood from about A.D. 37–41 and a piece of charcoal about 2600 yrs old. Results of the measurements were 2030±200 yrs and 2730±240 yrs respectively. *Subject Headings:* **1. Radiocarbon dating 2. Radioactive dating methods 3. Radioactivity measurement techniques. I. Magistrelli, F. II. Cortesi, C. III. Mantovani, T.** —*W.N.*

10L–92 551.508.25:539.16

Shashkin, V. L. (*Inst. of Geology, Kirghiz SSR*), **Metod opredeleniia natural'nogo fona schetchikov gamma-izlucheniia.** [Method of determining the natural background level of gamma-radiation meters.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 7:838–839, July **1956.** eqs. **DLC**—The method for determining the amount of background radiation was developed in 1948 and does not require that measurements be made over a large water surface. It involves partial screening from gamma radiation from surrounding sources by cylindrical lead screens. The procedure is described in detail and equations for calculating the natural background radiation are given. *Subject Headings:* **1. Gammameters 2. Radioactivity measurement techniques.**—*I.L.D.*

Radiometers

10L–93 551.508.25:551.510.71

*Sinitsyna, Z. L., **Ob opredelenii malykh kolichestv radona i torona v ikh smesi.** [Determination of small amounts of radon and thoron in their mixtures.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 7:950–953, July **1957.** table, 3 refs., 22 eqs. **DLC.** For English transl. see *Akademiia Nauk SSSR. Bulletin of the Academy of Sciences of the U.S.S.R. Geophysics Ser.*, No. 7:133–138, 1957, pub. **1958. DWB, DLC**—The author develops a separate method for determining small amounts of radon and thoron in mixtures of these gases so as to eliminate the errors inherent in the statistical nature of radio intensity and present in the usual method of determination by means of the ionization chamber. Equations are developed for computing the initial ionizing currents of radon and thoron on the basis of two values of the total ionization current, the calculation of concentration of radon and thoron for known values of the ionization currents $(I_0)_{Ra}$ and $(I_0)_{Tor}$ and the determination of errors in the concentration of these gases as a result of the statistical character of radioactive disintegration. Data on these errors present in the determination of radon and thoron in soil atmospheres are presented in tables. *Subject Headings:* **1. Radon content of soil air 2. Thoron content of soil air 3. Radioactivity measurement techniques.**—*I.L.D.*

10L–94 551.508.25

Brooks, F. A. (*Univ. of Calif., Agricult. Exp. Sta., Calif.*), **Gier and Dunkle black plate radiometers, University of California, Johns Hopkins University, and University of Texas.** (In: Lettau, H. H., and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:87–94. 4 figs., 7 refs.) **DWB**—The contents of this paper are as follows: the development and principles of the total and net exchange aspirated; black-plate radiometers invented by J. T. Gier and R. V. Dunkle; calibration errors and representativeness of the data; radiometer installation at O'Neill, Nebr.; methods of recording; remarks on data presentation in Vol. 2; data evaluation for heat balance consideration; and the considerations that need to be taken into account in properly mounting radiometers. *Subject Heading:* **1. Gier and Dunkle radiometer.**—*I.L.D.*

10L–95 551.508.21:551.521

Elovskikh, M. P. and Kondrat'ev, K. Ia. **Radiometr dlia izmereniia intensivnosti teplovogo izlucheniia atmosfery i sravnenie ego s pirgeometrom.** [Radiometer for measuring the intensity of

atmospheric heat radiation and its comparison with the pyrgeometer.] *Meteorologiia i Gidrologiia* Leningrad, 7:49–51, July **1957.** Fig., table, 5 refs., 3 eqs. **DWB, DLC**—With the aid of a diagra the authors describe the construction and principle of a radiometer (built by M. P. ELOVSKIKE which is a heat battery placed in a massive copper case with a small body angle of vision. TI angular distribution of the intensity of atmospheric heat radiation was measured with a mean erro of ±2.5%. From measurements of the intensity of radiation at several points of the sky it is possibl to determine the entire radiational flux from the entire hemisphere by integrating for the hemisphere the effect of the angular relationship of the readings of the instrument and wind influence upon th radiometer are excluded. Measurements of intensity of radiational heat flux made with the rad ometer in the summer of 1954 at Alma Ata were compared with those simultaneously made with pyrgeometer (which usually has a mean error of 15%). It was found that the pyrgeometer gav consistently lower values of effective radiation flux and hence higher values of atmospheric counte radiation. An equation is presented for measuring the effective radiation flux in a hemisphere whe intensity is measured in a zenithal direction, namely

$$F = f_0 \frac{\pi\psi}{\left[1 - \cos^2\theta_0 \frac{P_F(w \sec\theta_0)}{P_F(w)}\right]}$$

where f_0 = intensity of effective radiational flux in the zenithal direction; $2\theta_0$ = "effective" visual angl of the radiometer; ψ = ratio of radiation flux within limits of the body angle of the instrument to th isotropic flow in the hemisphere; $P_F(w)$ = function of penetration of the atmosphere to diffus radiation; w = content of water vapor in the atmosphere (g/cm²) calculated with a correction fo pressure. This formula is good only for a cloud-free sky. *Subject Headings:* **1. Radiometers 2 Radiation intensity measurements 3. Pyrgeometers.**—*I.L.D.*

10L–96 551.508.22

Johnson, D. S. (*Silver Hill Observatory*), **Progress report on radiometer tests.** Wash., D. C. U. S. Weather Bureau, Dec. **1956.** 20 p. 4 figs., 8 refs. **DWB** (MO8.21 U587)—The projec reported in this paper was undertaken in order to study instrumental and observational aspects o total hemispheric and total net radiation measurement in preparation for the IGY Antarctic Progra and other anticipated routine observations. The Beckman and Whitley, Kew, and Suomi net radi ometers are described, their performances compared and calibration against direct solar radiation i discussed. A calibration check procedure for Polar regions is proposed involving the use of an Epple pyrheliometer. *Subject Headings:* **1. Radiometer calibration 2. Radiation measurement equipmen 3. Radiometers.**—*G.T.*

10L–97 551.508.25

Mörikofer, W., **The Hamburg comparisons of long-wave radiometers.** *World Meteorologica Organization, WMO Bulletin*, 6(4):139–143, Oct. **1957.** 15 photos. **DWB**—Comparisons of many of the 20 different instruments for measuring the long wave radiation exchange were made during Sept. 1–15, 1955 and May 15–30, 1956 at Hamburg-Fühlsbuttel by SCHULZE of Hamburg and COURVOISIER of Davos. Results are outlined, instruments classified in several ways and illustrated and problems of development mentioned. Suppliers of the various instruments are listed. *Subject Headings:* **1. Long wave radiometer comparisons 2. Fühlsbuttel, Germany. I. Courvoisier, P.** —*M.R.*

10L–98 551.508.25 551.508.53/4

Stecker, Ernest J., **Advanced meteorological-instrument development in the Beckman & Whitley organization.** *American Meteorological Society, Bulletin*, 37(4):166–169, April **1956.** 4 photos. **DWB, DLC**—A description is given of the Beckman & Whitley wind speed and direction recording system and its applications, heat flow equipment such as the heat flow transducer and the thermal radiometer, the organization of the company, and its facilities. Photographs of the instruments developed are presented. *Subject Headings:* **1. Wind recorders 2. Radiometers.**—*I.L.D.*

10L–99 551.508.25:551.521.18

Stuart, Frank E., **A miniature transistorized radiometer for measurement of visible and infrared radiation from high altitude vehicles.** Colorado Univ. Upper Air Laboratory, Contract AF 19(604)- 1899, Scientific Report No. 1, Sept. **1958.** 24 p. 13 figs. (incl. photos), 7 refs. **DWB** (MO8.21 C719sc)—This report describes the miniature transistorized radiometer developed under Contract No. AF 19(604)-1899 (project HARM). Two models of this radiometer have been developed: one for measuring integrated radiation from the ultraviolet to the near infrared, with a long wave length cut off of approximately 4.5μ; the other for measuring integrated infrared radiation from approxi-

mately 4μ–30μ, which includes the spectral region containing most of the thermal radiation from the earth. Three radiometers have been built and operated a combined total of several hundred hrs. Tests on these instruments show them to be fairly rugged and foolproof. Various modifications of the optics and filter system will permit this instrument to be adapted to a variety of tasks in which the intensity being measured is not too low. *Subject Heading:* **1. Air-borne radiatiometers.**—*Author's abstract.*

10L–100 551.508.25

Suomi, V. E. (*Univ. of Wisconsin*), **University of Wisconsin net radiometer.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1: 95–98. fig., 4 refs., 2 eqs.) **DWB**—A discussion of those aspects of the theory and details of the construction which may be of some importance when the data collected by this instrument are compared with net radiation data collected by other net radiation instruments used in the O'Neill experiment. The practical application of Albrecht's net radiation, R, is given by the expression $R=K(T_1-T_2)$ where K =the calibration constant and T_1-T_2 =the temperature difference across the plate. The author discusses ventilation control, the spectral characteristics of the blackening layers, and the calibration and mounting and recording of the net radiation meter. A photograph of the instrument is presented. *Subject Heading:* **1. Radiometers.**—*I.L.D.*

10L–101 551.508.25

Tanaka, Haruo and Kakinuma, Takakiyo, **Equipment for the observation of solar radio emission at 9400, 3750, 2000 and 1000 Mc/s.** *Nagoya. Univ. Research Institute of Atmospherics, Proceedings,* 4:60–73, Dec. **1956.** 24 figs. (incl. photos), 8 refs. **DWB**—Equipment for the observation of solar radio emission at 9400, 3750 and 1000 Mc/s are completed. A radiometer for use at 2000 Mc/s is now being constructed. To facilitate comparison, all the paraboloids are made in similar figures. Each has a similar feed antenna of a circular waveguide connected to a turnstile circuit for separating polarizations. Equipment for use at 1000 (also at 2000) Mc/s has a device to indicate directly the percentage polarization of outstanding occurrences. Static modulators are used for 9400 and 3750 Mc/s radiometers. *Subject Heading:* **1. Radiometers.**—*Authors' abstract.*

10L–102 551.508.25:551.521.32

Yabuki, K. (*Coll. of Ag., Univ. of Osaka Pref.*), **On a net-radiometer. Journal of Agricultural Meteorology,** Tokyo, 14(2):65–68, Oct. **1958.** 4 figs. (incl. photo), table, 8 refs., 4 eqs. In Japanese; English summary p. 68. **DWB**—The exchange of heat energy on the field is a very important and interesting problem. However the measurement of terrestrial radiation is not easy, and several methods have been proposed to measure the radiation flux. This net radiometer is one of the open types with a small blower to ventilate the horizontal thermoelectric sensing element to avoid the influence of the natural wind, and its construction and characteristics are described. Examples are given, using the net radiometer to measure radiation of ground surfaces which were covered with different materials, as paper, glass, etc. Results are shown. *Subject Headings:* **1. Radiometers 2. Terrestrial radiation measurement techniques.**—*Author's abstract.*

Scintillation Counters

10L–103 551.508.25:551.521.64 621.387.4

Brennan, M. H.; Millar, D. D.; Rathgeber, M. H. and Wallace, C. S. (*all, Sch. of Physics, Univ. of Sydney*), **Air showers of size greater than 10^5 particles, Pt. 3, Comparison between the response of Geiger counters and scintillation counters.** *Nature,* London, 182(4642):1053–1054, Oct. 18, **1958.** foot-ref., eqs. **DWB**—Observations conducted with the Sydney air shower array permitted comparison of the difference in response of a tray of Geiger counters with scintillation counters. The operating procedure is described. The results which are presented and discussed, provide a method of comparison of estimates of shower sizes obtained by different detectors; however, limited in conversional β value if (which is quite possible) the ratio of Geiger particle density varies with distance from the shower core. The data are being analyzed for evidence which, if it does exist, will affect the shower size only insignificantly. *Subject Headings:* **1. Geiger counters 2. Scintillation counters 3. Cosmic ray showers.**—*W.N.*

10L–104 551.508.25:535.37:523.16

Cachon, P. and Sarazin, A. (*Inst. d'Etudes Nucléaires de l'Université d'Alger*), **Contribution à l'étude de photomultiplicateurs.** [Contribution to the study of photomultipliers.] *Journal de Physique et le Radium,* Paris, 19(10):792–793, Oct. **1958.** 2 figs. **DLC**—Description and functioning of an apparatus which generates very short luminous impulses, intended for the study of the photo-

multipliers. These impulses are got through simple transformation of impulses from electrons by luminescent screen. *Subject Headings:* **1. Photomultipliers 2. Scintillation counters.**—*A.V.*

10L–105 551.508.25:539.16 621.387.

†Krebs, A. T., **Early history of the scintillation counter.** *Science*, Wash., D. C., 122(3157):17–18 July 1, **1955.** 5 figs., 28 refs. **DWB**—The scintillation counter has developed since 1949 into one of the most valuable tools for experimental nuclear research, and has innumerable applications in problems of energy transport in irradiated material, in human radioactivity and in C–14 datin measurements. The present article reviews the developments from the Geiger Counter in 1926 to date, and illustrates several arrangements of the apparatus. *Subject Headings:* **1. Scintillation counters 2. Radio carbon dating 3. Geiger counters.**—*M.R.*

Ultraviolet Radiation Meters

10L–106 551.508.25:551.521.1

Carpenter, R. O'B. (*Baird Associates, Inc.*), **Radiation sources for the vacuum ultraviolet** Baird Associates, Inc. Cambridge, Mass. Contract AF 19(122)–432, Progress Report, No. 3 Sept. 30, **1951.** 59 p. fig., diagrs., 6 refs. **DWB**—Details of the construction and operation of two types of high intensity xenon lamps are given. The behavior of lines in the extreme vacuum ultraviolet region <2000 Å is expected to be revealed more clearly by studying the visible spectrum of gas discharge. Monitor lines are found at 1470 and 1295 Å. *Subject Headings:* **1. Ultraviolet spectrometers 2. Xenon lamps 3. Ultraviolet intensities.**—*M.R.*

10L–107 551.508.25:551.521.1

Eschke, W., **Ein Vorschlag für ein einfaches UV-Dosimeter.** [A suggestion for a simple UV-dosimeter.] *Angewandte Meteorologie*, Berlin, 2(8):237–240, June **1956.** 4 figs. **DLC**—A cheap portable UV dosimeter is described, with photo and wiring diagram. The dosis is measured by relaxation oscillations induced by periodic charge and discharge of a condenser connected to a charging resistance which varies with the radiation effect, and a lamp as discharge resistance. Calibration is described. It is suitable for Röntgen and gamma rays. *Subject Heading:* **1. Ultraviolet dosimeters.**—*C.E.P.B.*

10L–108 551.508.25:551.521.17

Hinzepeter, Hans, **UV-Messungen am Observatorium in Potsdam.** [Ultraviolet measurements at the Potsdam Observatory.] (In: International Radiation Conference, Davos, Sept. 1956, **Papers.** **1956.** [No. 7] 1 p. Mimeo.) **DWB** (M21.1 I61pa)—Cadmium photoelectric cells which have been used for a yr at Potsdam Observatory are described. The instruments record UVA and UVB radiation separately. Five such instruments will be used in the International Geophysical Year. *Subject Headings:* **1. Ultraviolet radiation measurement instruments 2. Photoelectric receivers 3. Potsdam Observatory.**—*G.T.*

10L–109 551.508.25

Kaplan, Joseph; Silvernail, Chester J. and Brook, Marx, **Design of a spectrographic camera for the fluorite and near infrared regions.** California. University Institute of Geophysics, Contract AF 19(122)-453, Reports No. 2 and 3, June 1–Sept. 1, and Sept. 1–Dec. 1, **1951.** 2 pieces. figs., eqs., refs. **DWB**—Auxiliary optical parts were computed for the middle spectrum (3000–6000 Å) and UV ranges as far as 1500 Å. Aberrations of outer field of camera also computed. Details of tests are given. A photographic camera was developed and tested, which gave excellent definition over the whole spectral range. *Subject Headings:* **1. Infrared spectrophotometers 2. Ultraviolet spectrophotometers.**—*M.R.*

10L–110 551.508.25:551.521.17

Stern, Sidney C. and Hill, Charles W. (*both, Camp Detrick, Frederick, Md.*), **Simple ultraviolet radiometer.** *Review of Scientific Instruments*, N. Y., 26(12):1122–1124, Dec. **1955.** 4 figs., 10 refs. **DWB, DLC**—This paper describes in some detail a radiometer for measurement of ultraviolet radiation from sun and sky. As designed, the instrument is selectively responsive to a narrow band of wave lengths and is capable of detecting and measuring low energy levels. The radiometer consists of a photoelectric sensing element, an ultraviolet transmitting window, and a dry cell battery mounted in a small housing. Calibration of the instrument shows satisfactory agreement with Lambert's cosine law and a linear relationship between energy flux and output of the phototube. For recording the signal from the radiometer the output is fed to a direct current amplifier which in turn drives a recorder. A typical recording for a cloudy day is presented. *Subject Headings:* **1. Radiometers 2. Ultraviolet radiation measurement instruments.**—*Author's abstract.*

TEMPERATURE MEASUREMENT INSTRUMENTS (551.508.26)

Thermometers

10L–111 551.508.26:621.315

Agari, S. (*Met. Res. Inst., Tokyo*), **Development of the remote-reading-and-recording thermometer with sealed carbon filament.** *Papers in Meteorology and Geophysics*, Tokyo, 4(2):61–65, Sept. **1953.** 6 figs., 2 refs. **DWB**—Improvements in the remote reading and recording thermometer with sealed carbon filament are reported. As to its application, a portable remote temperature indicator, a remote sea depth and temperature indicator and an automatic temperature regulator are described. *Subject Headings:* **1. Distant recording equipment 2. Thermometers.**—*Author's abstract.*

10L–112 551.508.26:621.317

Barber, C. R., **A platinum resistance thermometer for use at low temperatures.** *Journal of Scientific Instruments*, London, 32(11):416–417, Nov. **1955.** 2 figs., table, ref. **DWB**—A platinum resistance thermometer of external dimensions 75×2.5 mm suitable for use at low temperatures is described. The resistance coil is sealed in a thin walled platinum sheath in an atmosphere of helium by means of a lead glass to platinum seal. The reproducibility of reading is shown to be ±0.001°C at the ice point after a number of temperature cycles down to −260°C over a period of 16 months. *Subject Headings:* **1. Platinum resistance thermometers. 2. Low temperature thermometers.**—*Author's abstract.*

10L–113 551.508.26

Behar, Manoel Felix de Mayo, **Thermometry.** (In his: **The handbook of measurement and control.** Pittsburgh, **1951.** p. 82–97. 16 figs., 3 tables.) **DWB**—Author discusses fundamentals of temperature measurement, presents a rational classification of measurement methods and discusses in detail the mercury in glass, solid expansion pressure-spring or filled system thermometers, as well as the resistance thermometer. *Subject Headings:* **1. Thermometry 2. Thermometers.**—*A.A.*

10L–114 551.508.26:551.501.7

*Beneke, Jack, **Development of a miniature vortex free-air thermometer.** Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y., Contract NOa(s)-54-156-C, Final Report, Nov. **1, 1956.** 69 p. 42 figs. (incl. photos), table.—Designed for light weight, small size and low drag, accuracy and rapid response. Weighs <2 oz. Development of the tiny resistance thermometer and vortex tube, laboratory and wind tunnel tests up to simulated altitudes of 40,000 ft, design of the prototype model, geometry of vortex tube are reported and illustrated by numerous photos and line drawings. A detailed temperature survey, inside a vortex (inside diameter 0.43″ and length 2.5 to 6.5″) by Leonard Bogden, is appended (p. 56–64). Pressure data are appended on p. 65–69 for the 5 models developed. *Subject Headings:* **1. Vortex thermometers 2. Airborne thermometers.**—*M.R.*

10L–115 551.508.26

Glazova, E. F., **Prichiny vozniknoveniia neispravnosteĭ rtutnykh termometrov i vozmozhnosti ikh ustraneniia.** [Causes of defects of mercury thermometers and the possibility of eliminating these causes.] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:45–46, April **1958.** fig., ref. **DWB, DLC**—The fundamental factors causing defective thermometers are breakage of the mercury column, breakage of the scale plate and soiling of the capillary tube. An examination of these defects indicates the need for replacing the glass scale plate with a more sturdy plastic. The breakage of the mercury column occurs mostly at localities with low temperature caused by the presence of gas in the mercury. This occurs usually at air temperatures below -40°C. On further cooling of the thermometer, a free space is formed between the glass of the capillary and the reservoir, on the one hand, and the surface of the mercury on the other as a result of the large temperature expansion coefficient in comparison with that of the glass. This space fills with gas arriving from the upper part of the capillary. When the air temperature rises and the mercury "thaws" part of the gas is separated by the mercury from the principal mass in the upper part of the capillary and bubbles are formed. The soiling of the mercury is a result of admixtures of impurities. Methods of eliminating these defects are described briefly. *Subject Headings:* **1. Thermometers 2. Thermometer bursting.**—*I.L.D.*

10L–116 551.508.26

Henderson, S. M., **A constant-feed all-temperature wet bulb.** *Agricultural Engineering*, 33(10):644, Oct. **1952.** fig., 4 refs. **DLC**—A wet bulb is designed to provide a continuous unattended record from 32°F–190°F. Sensing unit is a thermocouple, combined with water reservoir (glass tube). Water level is maintained by means of a Mariotte bottle. *Subject Heading:* **1. Wet bulb thermometers.**—*A.A.*

10L–117 551.508.2

Thermistor thermometer. *Instruments*, Pittsburgh, Pa., 26(11):1644, 1646, Nov. **1953. DW**
—Telethermometer with thermistor element described and illustrated. Range 68°F–105°F ar
has scale in °C and °F. Accurate to 0.25°C but can be calibrated to an accuracy of .1°C. Whea
stone bridge control. *Subject Headings:* **1. Telethermometers 2. Thermistors.**—*M.R.*

10L–118 551.508.26:551.525

Kakas, József, **Az altalaj hömérsékletének mérése.** [Measurement of subsoil temperature
Időjárás, 56(5/6):169–173, May/June **1952.** 6 figs. **DWB**—Current mistakes made in the desig
of various types of Lamont soil thermometer sheaths are discussed. Some old fashioned types sti
in limited use will not give correct readings because direct contact with the soil is not establishe
Design and use of correct Lamont soil thermometer sheath is described in detail and illustrate
Subject Headings: **1. Soil thermometers 2. Soil temperature measurement techniques.**—*G.T.*

10L–119 551.508.26:621.31

Kamamoto, H. and Kimura, S., **On the nickel resistance thermometer for meteorological use**
Journal of Meteorological Research, Tokyo, 5(1):31–36, March **1953.** 5 figs., 4 refs. In Japanese
English summary p. 31. **DWB**—An airplane resistance thermometer was adapted for weathe
station use. Nickel was selected for the resistance bulb, the thermal coefficient being abou
5.2×10^{-3}; to avoid the change of electric source voltage a cross coil meter with compensation circui
was used. The ranges are $-25°$–$15°$ and 0°–40°C and the minimum scale is 1°C. By using
reflecting mirror the sensitivity may be increased to the order of 0.1°C. *Subject Heading:* **1. Resist
ance thermometers.**—*G.T.*

10L–120 551.508.26:551.525.

Liana, Franciszek (*PIHM-Warsaw*), **Termometr gruntowy z kapilara kompesacyjna.** [So
thermometer with a compensating capillary tube.] *Przegląd Geofizyczny*, Warsaw, 1(3/4):209–212
1956. fig., table, eqs. **DWB, DLC**—The soil thermometer described and illustrated in this note i
similar to the one described by ANGOT in 1918. It has two identical parallel capillary tubes, one o
which is not connected with the mercury cistern. The difference between readings of the tw
columns indicates the temperature at the depth of the cistern. A small auxiliary thermometer fo
air temperature readings is mounted on the upper part of the instrument. *Subject Heading:* **1. Soi
thermometers.**—*G.T.*

10L–121 551.508.26:551.55

McDonald, James E. (*Iowa State College*), **Lag effects in the measurement of turbulent tempera
ture fluctuations.** Iowa. State College of Agriculture and Mechanical Arts. Dept. of Physics
Contract AF 19(122)-440, Scientific Report No. 1, Feb. 1, **1952.** 28 p. 2 figs., refs., 25 eqs. **DWE**
—The differential equation of response of a thermal sensing element is derived and the use of the
inverted lag equation to estimate (1) errors due to lag (2) the amount by which the true ambient
temperature at any instant is algebraically greater than the simultaneously indicated temperature
(3) and to compensate the output of a lagging element so as to correct for lag effects before recording
The determination of the lag function of the head transistor by electrical measurement of variations
of its lag time under varying ventilation rates is discussed. The extent to which lag effects distort
apparent statistical characteristics of the recorded fluctuation is analyzed. *Subject Headings:*
1. Turbulent temperature fluctuations 2. Thermometer lag.—*I.L.D.*

10L–122 551.508.26:53.089.6

Michels, A.; Wassenaar, T.; Sluyters, Th. et al., **The triple points of carbon dioxide and of argon
as fixed points for the calibration of thermometers.** *Physica*, Amsterdam, 23(2):89–94, Feb. **1957.**
2 figs., table, 5 refs. **DWB**—The International Temperature Scale for resistance thermometers is
defined with the help of a number of fixed points, at which thermometers should be calibrated. In
the temperature region below 0°C the definition, which is now valid, is not satisfactory. In the
present paper it is proposed to introduce the triple points of carbon dioxide and of argon as fixed
points. An instrument is described in which those triple points can be realized and maintained long
enough for calibration purposes. Some data are given which show that the reproducibility is of the
order of 0.001°C. *Subject Heading:* **1. Thermometer calibration.**—*Authors' abstract.*

10L–123 551.508.26:536.2

Morse, Bonard E. (*Texas U. Elec. Eng. Res. Lab.*), **Development of an Albrecht type meter for
the measurement of heat flux in the soil.** Texas. University. Electrical Engineering Research
Laboratory, Contract AF 19(604)-183, Scientific Report No. 4-01, May 30, **1952.** 43 p. 20 figs.,

tables, foot-refs. **DWB**—Discussion of a number of heat flow meters. The Albrecht design was found to be the most suitable for measurement in the soil. The instrument was improved using four planform rod thermistors horizontally one above the other. Three of the sensing elements were equipped with wire heated for the measurements of the thermal conductivity in situ. A detailed mechanical description is given. Only a few test measurements were made. *Subject Headings*: **1. Heat conductivity in soil 2. Soil heat flow meters. I. Albrecht, F.**—*A.A.*

10L–124 551.508.26

Negretti & Zambra, Ltd., London, **A story of temperature measurement.** London, April **1958.** 10. p. figs. and ports., 15 refs. **DWB** (MO8.26 N385st)—The evolution of the liquid-in-glass thermometers as based upon available literature is told here, including original quotations related to dubious questions such as who invented what, when and how. The designs and illustrations are very interesting. A short bibliography is also given. *Subject Headings:* **1. Temperature measurement techniques 2. Thermometers.**—*W.N.*

10L–125 551.508.39:537.7

Obst, Dankwart, **Abschätzung der zulässigen Belastung bei elektrisch passiven Temperaturmessfühlern.** [Evaluations of permissible load of electrically passive temperature sensing elements.] *Zeitschrift für Meteorologie*, Berlin, 11(5/6):157–160, May/June **1957.** 3 figs., 3 refs., 21 eqs. **DWB, DLC**—By means of analogies between the physics of heat and electricity the author computes exactly the heat conduction from measuring sensing elements of spherical or rodlike form. The transition transfer resistance of a sphere is calculated from the equations for a stationary current field of a point source; the equation is $R = \kappa\ddot{u}(u/I) = (I/4\pi kr)$ where I = distance, k = conductivity and r = radius. The equation for calculating the transition resistance of round rods of final length is $R_{z\ddot{u}} = (U/I) = [1n(2L/d)/2\pi kL]$ where L = distance. Finally an equation is derived for computing the heat transition resistance of sensing elements of mathematically complex form by setting it equal to that of a sphere of similar surface. With the aid of the analogies and the transition resistance, the equation for determining the heat conduction in equivalent electrical conduction at a given temperature is $N_{elk} = (4\pi/0.239) \cdot \lambda \cdot r \cdot \Delta T\,[W]$. *Subject Heading:* **1. Electrical resistance thermometers.**—*I.L.D.*

10L–126 551.508.26:551.507.352

Owens, George V., **Investigation of the characteristics of a tangential flow vortex thermocouple housing.** Chicago. Univ. Dept. of Meteorology, Contract AF 19(604)-618 (Cloud Physics Research), Technical Note, no. 3, Aug. 31, **1955.** 21 p. 6 figs., 13 refs., 10 eqs. **DWB**—When attempts are made to measure the ambient air temperature from an airplane in flight, errors of considerable magnitude are caused by wetting of the thermoelement by cloud or raindrops and by pressure differences between the element and the outside atmosphere. Several types of housings are used to reduce these effects. The vortex thermometer and the reverse flow housing (anti-icing housing) were found by the Cloud Physics Project to be the most successful devices for reducing errors in flight. The present study concerns the vortex housing. It was found that the housing operates at its wet bulb temperature in a cloud and approaches the clear air wet bulb temperature on emerging from a cloud. Also a constant negative error due to pressure was found. The anti-icing housing showed less negative error in a cumulus cloud (southwest of Puerto Rico). *Subject Headings:* **1. Vortex thermometers 2. Air-borne temperature measurements 3. Temperature measurement in cumulus clouds.**—*M.R.*

10L–127 551.508.26:551.507.352:551.574.1

Owens, George V., **On the measurement of true air temperature in cloud physics research.** Chicago. Univ. Dept. of Meteorology, Cloud Physics Lab., Contract AF 19(604)-1931 Technical Note No. 13, April 1, **1958.** 25 p. 7 figs., 23 refs., 4 eqs. **DWB**—A review of the principles of aerodynamic heating of ordinary aircraft temperature elements is presented. This shows that the recovery factor is the result of a nonisentropic viscous heating factor, which is constant, and an isentropic cooling factor, which varies with air speed and altitude. The cooling factor results in anomalous indications of true air temperature when a constant recovery factor is used in data reduction. In the application of this concept to the reverse flow type temperature probe it is found that the temperature element senses the recovery factor of the probe structure. This results in a reduction in the magnitude of the anomalies in indicated temperature. It is shown that the cooling factor or a vortex probe is greater than that for ordinary elements and can result in greater anomalies in the indication of true air temperature. These anomalies can be reduced by careful design and construction of the probes, but in the case of the vortex probe it is doubtful that the unimportant advantage of a zero recovery factor is worth the great effort and expense necessary to attain this characteristic. *Subject Heading:* **1. Airplane thermometer corrections.**—*Author's abstract.*

10L–128 551.508.26:551.525

Primault, B. (*Inst. Suisse de Meteor., Zurich, Switzerland*), **The measurement of soil temperatur** *World Meteorological Organization, WMO Bulletin*, 8(2):88–93, April **1959.** 2 figs., photo. **DWB** Insertion of a soil thermometer may change the conditions in the soil so that false soil temperatu data are obtained, especially if soil is dry and easily cracked, letting surface air penetrate to the bul At Zurich horizontal platinum resistances were found to give up to 3°C difference; readings fro vertical mercury thermometers showed a lag at all levels −10, 20 and 50 cm—and at all seasons aft a rainy period. Tests were made of standard instruments from 7 countries (U. S., U.S.S.R., Ea and West Germany, Switzerland, U. K. and France), all of which were calibrated from 0°–30° against a standard thermometer and values corrected accordingly so the results were free from instr mental errors. Three months of trials revealed large differences between instruments as show graphically for each month and for mornings and evenings, respectively. Similar types of instr ments also showed wide variations. Diurnal variations shown graphically for the several types a greater for the horizontal elements than for the vertical. Lead is the best material. Weight column of soil above horizontal element closes the pores and brings the soil in closer contact wit element. Roughness of lead also aids in adhesion. *Subject Headings:* **1. Soil temperature accurac 2. Soil thermometer comparisons 3. Zurich, Switzerland.**—*M.R.*

10L–129 551.508.26:551.501

Ruskin, Robert E.; Schecter, Roger M.; Dinger, J. E. and Merrill, R. D. (*NRL Aerolog Branch*), **Development of the NRL axial-flow vortex thermometer.** *U. S. Naval Research Laboratory NRL Report* 4008, Sept. **4, 1952.** 32 p. 17 figs., 5 refs. **DWB**—Detailed description of the NR thermometer with illustrations of its parts, assembly, circuits and principles of operation. Th instrument is based on compensation of dynamic heating in flight by automatic refrigeration. Opera tion, response time and accuracy are discussed. When tested in simulated flight at speeds up t 500 mph, the apparatus gave readings of true free-air temperature with an accuracy of ±0.3°C *Subject Headings:* **1. Air-borne thermometers 2. Vortex thermometers.**—*G.T.*

10L–130 551.508.26:551.501.

Ruskin, Robert E.; Bailey, Shady O. and Schecter, Roger M., **Preliminary installation notes fo the NRL axial flow vortex thermometer, Model NAX-4-51.** *U. S. Naval Research Laboratory, NRI Memorandum Report*, No. 46, Oct. **10, 1952.** 8 p. 5 figs., 3 refs. **DWB**—Measurements of free ai temperature with a conventional thermometer during flight will require a correction of about 25° 500 mph. The axial flow vortex thermometer was tested in simulated flight at the same speed an gave true free air temperatures within 0.3°C. The thermometer was developed at NRL, and thi report contains a detailed description of the instrument, its function and installation, and locatio on aircraft. *Subject Headings:* **1. Air-borne thermometers 2. Vortex thermometers.**—*W.N.*

10L–131 551.508.2

Schopper, Erwin (*Weissenau, Germany*), **Untersuchungen an Thermometerkörpern.** [Investi gation of thermometer elements.] *Germany. Deutscher Meteorologischer Dienst im Französische Besatzungsgebiet, Wissenschaftliche Arbeiten*, 1:144–151, **1947.** 7 figs., 5 tables. **DLC**—Research o the radiative properties of thermometers, especially of the bimetallic elements of thermographs an the errors therein. *Subject Heading:* **1. Thermometers.**—*M.R.*

10L–132 551.508.29:551.501.

Shchelokov, V. V. (*Geophys. Inst., Acad. Sci., USSR*), **Samoletnyĭ termometr.** [Airplan thermometer.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofizich.*, No. 5:569–576, May **1956** 6 figs. (incl. photos), 3 refs., eqs. **DLC.** Also issued in: Mezhvedomstvennaia Konferentsiia p Voprosam Issledovaniia Oblakov, Osadkov i Grozovogo Elektrichestva, 5th, Leningrad, 1956 **Issledovanie oblakov, osadkov i grozovogo elektrichestva.** Pub. **1957.** p. 181–182. **DL** (QC921.M4 1956c)—A description with the aid of diagrams and photographs of theory and construc tion of a sensitive resistance thermometer for use in airplanes to measure the fine thermal structur of the atmosphere, especially convective movements in the atmosphere. *Subject Headings:* **1. Air borne thermometers 2. Resistance thermometers 3. Thermal structure of the atmosphere 4. Convective currents.**—*I.L.D.*

10L–133 551.508.29:621.31

Stimson, H. F. (*National Bureau of Standards*), **Precision resistance thermometry and fixe points.** (In: American Institute of Physics, **Temperature, its measurement and control in scienc and industry,** Vol. 2, pub. **1955.** p. 141–168. 5 figs., 12 refs.) **DWB, DLC**—Various fixed point are used in calibrating resistance thermometers. Development of resistance thermometry, bridge boilers, triple point baths, etc. is outlined. The triple point of water is considered a better fixe

point than the melting point of ice. Temperatures at the triple point can be determined to within .00008°C, although after cells become about 2 yrs old errors of .002° were found (due to impurities). Precision manometers, used for gas thermometry, are also described and illustrated in detail. Temperatures by this means can be determined to about .00001°C at the steam point. Equipment for determining temperatures at the sulfur point and the oxygen point, and its accuracy, is also described. In spite of the high degree of precision, much higher could be obtained. *Subject Headings:* **1. Resistance thermometers 2. Thermometer accuracy 3. Precision thermometry.**—*M.R.*

10L–134 551.508.26:551.525.4

Stoenescu, St. M., **Instalarea termometrelor in stratul arabil de sol.** [Installation of thermometers in the arable layers of the soil.] *Meteorologia si Hidrologia*, Bucharest, 1(1):45-46, Oct. 1956. fig. **DWB**—Operation and accuracy of a soil thermometer are discussed and illustrated. The tube of the instrument protected by a cylinder against soil pressure, is inserted into the soil horizontally. It can be used as a maximum-minimum thermometer by installing it in a position 5° from horizontal. *Subject Heading:* **1. Soil thermometers.**—*G.T.*

10L–135 551.508.29:621.317:551.525.4

Suomi, V. E., **Soil temperature integrators—University of Wisconsin.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:24). **DWB**—The author describes the construction of the resistance thermometers used to measure mean temperature changes for the soil layers 0–5 cm, 5–15 cm, and 15–50 cm depths. Each thermometer consisted of a uniform-pitch helix of nickel wire wound on a 9 mm polysterene rod. The wires were electrically insulated from the soil. "Twelve such rods with helices 5 cm long were connected into a series string 12 m long to form the 0–25 cm soil thermometer bank. A single resistance measurement is then equivalent to the average of 12 mean temperature measurements on the 0–5 cm soil layer at 12 points along a line roughly 12 m long." The resistance of the thermometers was read by manually balancing a Wheatstone bridge. Data on measurements are given in Vol. 2. *Subject Headings:* **1. Resistance thermometers 2. Soil temperature measurement techniques.**—*I.L.D.*

10L–136 551.508.29:537.7

Surazhskiĭ, D. Ia., **Elektrotermometr uzla kushcheniia.** [Electrothermometer for root clumps.] *Leningrad. Nauchno-Issledovatel'skiĭ Institut Gidrometeorologicheskogo Priborostroeniia, Trudy*, No. 5:145–148, **1957.** 2 figs. **DWB, DLC**—A description of the construction and properties of an electrical thermometer capable of measuring at a distance the temperatures of root clumps at several points in a cultivated field. The measurement device is based upon the principle of the variation of the resistance of a conductor as a function of temperature. The electrical distance thermometer AM-2 consists of ten thermoelectric elements each of which consists of a nickel wire resistance thermometer enclosed in a flat container of sheet nickel. By means of a two-ply nickel cable the elements are united to the measuring panel which contains a recording device (a micrometer inserted into a measuring diagonal of an inequilibrated Wheatstone bridge), control resistance, rheostat for maintaining the calibration current and switches of temperature ranges. The operation of this device and its use in the field are described. The results of observations show the following: the difference between readings of the AM-2 apparatus and a psychrometric thermometer before the experimentation did not exceed ±0.6°C; the difference between the AM-2 apparatus and a psychrometer after experimentation did not exceed ±0.5°C. A table showing the errors of the apparatus AM-2 relative to the TVP-50 is presented. An illustration of the apparatus with its elements and a wiring diagram are presented. *Subject Heading:* **1. Electric thermometers.**—*I.L.D.*

10L–137 551.508.26

Swinamer, E. M. A., **Spirits in the spirit column.** *Weather*, London, 8(2):51–52, Feb. **1953.**—Mystery of low readings of minimum thermometer at Halifax, N. S. *Subject Headings:* **1. Thermometry 2. Halifax, N. S.**—*C.E.P.B.*

10L–138 551.508.26

Ultrakust, —, **Thermomètre à sonde germanium.** [Germanium sonde thermometer.] *Mesures et Contrôle Industriel*, Paris, 23(258):913-915, Nov. **1958.** Fig. 2 tables. **DLC**—Description and functioning of a germanium sonde thermometer "Thermophil." It is composed of a sensitive sonde and an indicator apparatus. The sonde contains the sensitive element, a semiconductor in germanium only 0.25 mm. The indicator apparatus contains the measurement indicator, the electronic amplifying device and the cells. This thermometer is very handy and gives an instantaneous reading of temperature. *Subject Headings:* **1. Thermometers 2. Thermophil.**—*A.V*

10L–139 551.508.29:551.525

Van Bavel, C. H. M. and Forrest, L. A., **Evaluation of dial thermometers for measuring so temperature.** *U. S. Agricultural Research Service, [Report] ARS* 41–9, Aug. **1956.** 10 p. 4 figs 3 tables. **DWB** (MO8.26 U581c)—Data for comparison between a resistance thermometer and commercial dial thermometer show the latter to be accurate by better than 1°F. Measurements soil temperatures at 4 in. and 8 in. depth were conducted in a 9-month period. Dial thermomete were found well suited for experimental and practical applications within agriculture and engineerin *Subject Headings:* **1. Soil temperature measurements 2. Resistance thermometers 3. Dial the mometers.**—*W.N.*

10L–140 551.508.2

Vorob'ev, I. E., **O pogreshnostiakh napochvennogo rtutnogo termometra.** [Errors of surfa mercury thermometers.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy,* 61(123):13 136, **1956. DWB**—Special tests, in order to evaluate the magnitude of errors of surface mercur thermometers, carried out on the meteorological platform of Vysokaia Dubrava Observatory (Sver lovskaia Oblast) are described, and the results are announced and discussed. *Subject Heading* **1. Thermometer errors 2. Sverdlovsk Oblast, U.S.S.R.**—*A.M.P.*

10L–141 551.321.4:551.508.2

Ward, W. H., **The glaciological studies of the Baffin Island expedition, 1950, Pt. 3, Equipmer and techniques.** *Journal of Glaciology,* 2(12):115–121, Nov. **1952.** 4 figs., 7 refs. English an French summaries p. 115. **DWB**—Describes instruments and methods for thermoelectric drillin in cold ice, mechanical drilling in cold rock and cold ice, measurement of temperature in ice an rock with thermistors, and of ice density. *Subject Headings:* **1. Ice thermometers 2. Baffin Islan** —*C.E.P.B.*

10L–142 551.508.26:681.

Weston Electrical Instrument Corporation, Newark, N. J., **Weston thermometers.** Its *Circula* T-13-H, April **1954.** 15 p. illus. Also its: **Tag industrial thermometers.** T-29-B, March **1954 Tag laboratory thermometers and hydrometers.** T-28-B, March **1954. Weston averaging resist ance thermometer.** T-25-C, Dec. **1952. Weston floating thermometer.** T-27-B, Feb. **1953 A.S.T.M. certified thermometer testing set.** T-16-A, Sept. **1952.** various pagings. all illus.— Specifications and prices for these laboratory and industrial thermometers (both direct reading an recording) are included in these well illustrated circulars. *Subject Headings:* **1. Thermomete specifications 2. Thermometers.**—*M.R.*

10L–143 551.508.22

Yajima, Yukio, **On the time lag of a thermometer.** *Journal of Meteorological Research,* Tokyo 6(12):615–625, Jan. **1955.** 7 figs., 7 tables, 13 refs., 13 eqs. In Japanese; English summary p. 615 **DWB**—Using the time lag coefficient (α) given by A. DE QUERVAIN (*Meteorologische Zeitschrift* 25:88–90, 1911) the author treated the time lag of the thermometer for three cases, i.e., when th environment temperature (1) is constant, (2) increases at a constant speed, and (3) changes peri odically, theoretically. The relative response and phase difference were computed for the last case *Subject Headings:* **1. Thermometer lag. I. Quervain, A. de.**—*H.A.*

10L–144 551.508.26

Yajima, Yukio, **On the response of meteorological instruments (thermometer).** *Journal o Meteorological Research,* Tokyo, 9(10):746–747, Oct. **1957.** 2 figs., table, 5 refs., 6 eqs. In Japanese **DWB, DLC**—Average time lag of response of a thermometer is obtained by semilog plots of time ano a ratio of thermometer reading. The popular mean value of time lag of a thermometer response ca be estimated from a given equation using *t*-distribution method. The equation of variationa amplitude of observed values and a sample calculation are given with table and graph of the perio and coefficient of variation of observed values. Confidence limit should be considered in actua observation. *Subject Heading:* **1. Thermometer lag.**—*J. Woo.*

10L–145 551.508.26:551.501.7:551.574.12

*Zaĭtsev, V. A. and Ledokhovich, A. A., **O vliianii oblachnykh i dozhdevykh kapel' na izmerenie temperatury vozdukha s samoleta.** [The influence of cloud and rain drops on air temperatur measurements from airplanes.] *Meteorologiia i Gidrologiia,* No. 6:41–44, June **1956.** 3 figs., 6 refs. eq. **DWB, DLC**—With the aid of a diagram, the authors describe a differential electrical ther mometer constructed by them for measuring the effect of cloud droplets upon temperature measure ment of air within clouds and during the exit from clouds. The results of observations made durin an airplane flight upon the effect of cloud droplets and rain upon air temperature measured with differential thermometer are presented and analyzed. It was found that airplane thermometer

not protected against cloud droplets, rain and ice formations may give a distorted air temperature distribution owing to melting and evaporation from the surface of the thermometer. *Subject Headings:* **1. Cloud droplet effect on temperature measurement 2. Air-borne thermometers 3. Temperature measurement.**—*I.L.D.*

10L–146 551.508.26

Ziegler, J. G. and Nichols, N. B., **Dynamic accuracy in temperature measurement.** *Instruments*, 23(1):66–69, Jan. **1950.** 12 figs., eqs. **DLC**—The lag of temperature measuring elements in their response to changes in the temperature measured is discussed and graphically represented for various industrial processes of fluids. A temperature transmitter with dynamic lag compensation, believed to be "a valuable and unique tool in the field of temperature measurement and control" is described and shown in diagrams. *Subject Headings:* **1. Thermometer lag 2. Temperature measurement.** —*G.T.*

Thermographs

10L–147 551.508.26:551.54:551.46

Folsom, T. R.; Jennings, F. D. and Schwartzlose, R. A., **Effect of pressure upon the "protected" oceanographic reversing thermometer.** *Deep-Sea Research*, New York, 5(4):306–309, May **1959.** ref., 10 eqs. **DWB**—Actual degree of protection offered by the shell of the usual "protected" reversing thermometer has been computed. It appears that in the average modern instrument errors of roughly 0.002°C per 1000 m sea depth change can be expected. However, certain protected instruments having an exceptionally small air volume below the cork have been found to be influenced by external pressure changes to as much as 0.008° per 1,000 m particularly at great sea depths. *Subject Heading:* **1. Bathythermographs.**—*Authors' introduction.*

10L–148 551.508.26:551.526.6 551.46.018.4

Lagutin, B. L. and Rybnikov, A. A., **Prigotovlenie stekol dlia termobatigrafa.** [Preparation of glass for bathythermographs.] *Meteorologiia i Gidrologiia*, Leningrad, No. 1:52–53, Jan. **1956. DWB, DLC**—Various methods for preparing glass for bathythermographs have been studied. The most simple and satisfactory technique for applying lampblack was found to be as follows: the glass is smoked on hot resin tallow in alcohol. Before the glass is smoked, it is dipped in alcohol or pure benzene. The lampblack is applied in a thin layer, the glass being 10–15 sec in a flame. After cooling, the glass is immersed in a solution of alcohol and shellac. *Subject Heading:* **1. Bathythermographs.**—*I.L.D.*

10L–149 551.508.26

Mihara, Y. (*National Inst. of Agric. Science*), **Liquid thermometer recorder.** *Journal of Agricultural Meteorology*, Tokyo, 13(3):97–98, Feb. **1958.** 3 figs., table, eqs. In Japanese; English summary p. 98. **DWB**—The recording liquid thermometer described below was designed primarily to record the water temperature in the field with an accuracy of 0.05°C or less. L. O. Cook, in 1940, designed a similar recorder, in which the record was obtained by casting the shadow of a flat section mercury column of a glass thermometer onto bromide paper. The shadow casting method, however, is not so good for precision recording, because light flux passes through the vacuous column of the glass thermometer are dispersed and do not make distinctive contrast against the shadow of the mercury column. Instead of mercury, the present author utilizes a transparent liquid with the suitable coefficient of expansion and refractive index μ. The value of μ is decided as it makes the glass tube with the liquid column a thick lens, which has a proper focus length. The instrument consists of four parts: a liquid thermometer, a drum carrying the bromide paper, a light source and multiflex mirrors, and a constant clock. The thermometer has a round section liquid column and an accurately graduated scale and its bulb is coated with black lacquer or covered by a thin-walled tube to cut off light penetration into the thermometer. Light from a 4V point-source map reaches the thermometer through a slit after reflecting between two mirrors and with full path of 75 cm. A constant clock has two functions: driving the drum carrying the bromide paper and operating the light switch intermittently. Specimen records are shown with the vertical lines marking the time, and the horizontal lines, half degree with the heavy line at 10°C, as an index. *Subject Heading:* **1. Thermographs.**—*Author's summary.*

10L–150 551.508.26-551.526:551.46.018

Snodgrass, James M. (*Scripps Inst. of Oceanog., La Jolla, Calif.*), **Consideration of future oceanographic instrumentation.** *National Research Council, Wash., D. C., Publication*, No. 473:149–156, **1957.** fig. **DWB** (551.46 N277pr), **DLC** (GC57.N33, 1956)—The author enumerates recent instrumentation developed at the Scripps Institution of Oceanography under a contract with the

Bureau of Ships. A description is given of the modern bathythermograph that is used for depth sensing. It bears the name of "Vibroton." *Subject Headings:* **1. Oceanographic instrumen 2. Bathythermographs 3. "Vibroton."**—*N.N.*

10L–151 551.508.26:551.526

Sysoev, N. N., **Opyt registratsii temperatury poverkhnostnogo sloia moria deformatsionny zhidkostnym termografom.** [An experiment of temperature registration of the surface layer of th sea by a deformative fluid thermograph.] *Akademiia Nauk SSSR. Institut Okeanologii, Trudy* 5:73–77, **1951.** 6 figs. **DLC**—Without going into a discussion of principles and technicalities o thermograph construction the author presents a description of a modified serial deformation (manom metric) fluid thermograph ("Metpribor" make) installed in the machine room of the Soviet exped tionary ship "Vitiaz'" as well as the results of its temperature registration of the surface layer of th sea during a 16 day voyage. The uninterrupted registration of the temperature curve (16 days) i presence of sharp oscillations of temperature (5–14°) checked every 3 hrs by control measurement of the water samples showed a high precision level of recording and was evaluated at ±0.15°. Fig ures, graphs and samples of temperature curves are appended. *Subject Heading:* **1. Sea temperatur thermographs.**—*A.M.P.*

INSTRUMENT SHELTERS (551.508.27)

10L–152 551.508.27:551.52

Bauer, Wilhelm and Buschner, Richard, **Beitrag zur Messung der Lufttemperatur mit ver schiedenen Formen des Strahlungsschutzes.** [Contribution to the measurement of atmospheri temperature with various kinds of instrument shelters.] *Germany. Deutscher Wetterdienst Be richte*, 3(19):**1955.** 12 p. 13 figs., 4 tables, 7 refs. **DLC**—The manner in which radiation shadin influences true air temperature was investigated with the aid of three different types of instrumen shelters and a specially designed highly reflecting aluminum shield. Statistical data on the frequenc distribution of the dependence of deviations from Assmann value as a function of degree of shelter mean deviation of air temperature from ASSMANN value, and the correlation between changes of ai temperature and the deviation in the various installations are presented. The relationship betwee heat capacity of the shelter and air temperature are not comparable with the ASSMANN values. Th value of the aluminum temperature shield in climatological measurements is discussed. *Subjec Headings:* **1. Temperature measurement 2. Instrument shelters.**—*I.L.D.*

10L–153 551.508.2

*Dobrilović, B., **Prilog poretenju temperature i vlaznosti vazduha u meteoroloskom zaklonu neposredno izvan njega.** [Comparative data of temperature and humidity in an instrument shelter and its immediate vicinity.] *Yugoslavia. Hidrometeoroloska Sluzba, Vesnik*, 5(1/2):25–31, Jan.–June **1956.** 8 tables. **DWB**—Data on comparative temperature and humidity measurements made in 1955 on a mountain (elevation: 1200 m) in, and immediately outside an instrument shelter, are tabulated. The temperature and humidity differences obtained and their dependence on cloudiness time of the day, etc., are discussed. On the average, dry bulb temperature was 0.1°C higher and wet bulb temperature 0.05°C lower in the shelter than outside. Relative humidity was 1% lower in the shelter. *Subject Headings:* **1. Instrument shelters 2. Temperature measurements 3. Humidity measurements 4. Yugoslavia.**—*G.T.*

10L–154 551.508.27:621.05

Fischer, A., **Spannschuh für Justierschrauben,** [Holding socket for adjusting screws.] *Germany. Deutscher Wetterdienst. Instrumentenamt Nord, Hamburg, Technische Mitteilungen des Instrumentenwesen*, No. 28:12–13, Oct. **1954.** 3 figs. **DWB**—The author describes a holding socket for stands which lack screw threads. A cross section of the device which prevents overturning rather than providing a firm attachment is presented. *Subject Heading:* **1. Instrument shelter fixing.** —*I.L.D.*

10L–155 551.508.27:551.508.25

Kuwana, J. and Fukuda, T. (*both, Aerological Obs.*), **Automatic rain shelter atmospheric radiometer.** *Tateno, Japan. Aerological Observatory, Journal*, 6(1):63–67, Jan. **1957.** 3 figs. In Japanese; English summary p. 63. **DLC**—An automatic rain shelter suitable for an atmospheric radiometer has been designed and constructed. The design specifications are as follows: 1) A shutter which protects the thermopile from rain is automatically closed without delay when a rain sensing element of the apparatus catches a rain drop; 2) The shutter is automatically open only in case of no rain for 5 or more consecutive min; 3) The operation time for opening or closing does not exceed 15 sec; 4) The faulty operation of the apparatus is automatically relayed to a person in charge of the

bservation by an electric alarm bell; 5) The apparatus operates on 100V ac. In this paper, the inciples and the operational performance of the apparatus which is designed to meet the above quirements are described in detail. The apparatus consists of a rain sensing part, a relay unit, nd a motor driven shutter. The apparatus constructed operates smoothly, and its application to the her meteorological instruments is available. *Subject Headings:* **1. Instrument shelters 2. Radi-meters.**—*Authors' abstract.*

10L–156 551.508.27:551.508.29

Mäde, Alfred, **Ein Schutzkorb für das Platin-Widerstandthermometer des Reichswetterdienstes** [Basket shield for the platinum resistance thermometer of the National Weather Bureau.] *Meteorologische Zeitschrift*, Nov. **1938.** p. 415–417. 2 figs., 2 foot-refs. **DWB.** Photostat of typescript transl. into English (4 p.) by M. Slade available for reference. **DWB** (M08.26 M181ba)—A basket shield for a resistance thermometer has been developed by the German National Weather Bureau. It is to be used for microclimatic and plant-stand climatic measurements under greatly varying conditions during any investigation of the mechanical protection that might be provided against radiation. Original investigations indicated that the radiation error of the resistance thermometer of the German National Weather Bureau was 0.1°C with an irradiation of 1.4 cal/cm²/min. The experimental apparatus together with the thermometer in its technologically usable form had an error of 0.2–0.4°C. Therefore, a radiation error of 0.2°C is assumed for insolation when the basket shield is used for such measurements. *Subject Headings:* **1. Resistance thermometers 2. Radiation shelters.**—*N.N.*

10L–157 551.508.27

Nakajima, M.; Akita, I. and Kondo, G., **A study of radiation shelter.** *Journal of Meteorological Research*, Tokyo, 8(5):290–300, June 15, **1956.** 16 figs., 5 tables, 4 refs. In Japanese; English summary p. 290. **DWB, DLC**—Shielding effect of various single or double plates was examined, using the radiation of a 500 w electric lamp. The use of plate aluminum proved suitable. *Subject Heading:* **1. Radiation shelters.**—*Authors' abstract.*

10L–158 551.508.27

Paracchini, Salvatore, **Sulla misura della temperatura dell'aria nelle capannine meteorologiche: costruzione di una capannina meteorologica adatta per il clima mediterraneo.** [Air temperature measurements in meteorological screens; construction of a meteorological screen adapted to the Mediterranean climate.] *Rivista di Meteorologia Aeronautica*, Rome, 17(1):31–42, Jan./March **1957.** 17 figs. (incl. photos), 15 refs. Italian, French, English and German summaries p. 31. **DLC**—Criteria followed in the construction of a new meteorological screen meeting the requirements of the Mediterranean climate, and chief characteristics of this screen. The results of comparative measurements with reference to other screens used by the Italian Weather Service are reported. *Subject Headings:* **1. Instrument shelters 2. Temperature measurements 3. Instrument shelter comparisons.**—*Author's abstract.*

10L–159 551.508.27:551.506.3:551.524.3(691)

Poisson, Charles, **Abri météorologique et température à Tananarive.** [Meteorological shelter and temperature in Tananarive.] *Madagascar. Service Météorologique, Publication* No. 6, **1940.** 21 p. 13 tables. **DWB**—A single type of instrument shelter was used at Tananarive, Madagascar from 1889–1929. A new type was tested and has been used since 1934. A systematic error was found in the older records which has been removed by using the new apparatus. The old shelter and the instruments used are described; and the results of such observations, of the first tests (1924–29), and of the modified shelter (1929–33) are discussed. Comparative hourly temperature data are given for the periods 1899–1929, 1930–39, and 1934–39. Vapor pressure and relative humidity data are also given for 5 times a day for each month during these periods. *Subject Headings:* **1. Instrument shelters 2. Instrumental errors 3. Temperature measurements 4. Tananarive, Madagascar. I. Madagascar. Service Météorologique.**—*M.R.*

10L–160 551.508.27

Schüepp, Max (*Zurich*), **Die Temperaturdifferenzen zwischen verschiedenen Thermometeraufstellungen.** [Temperature differences between various thermometer exposures.] *Schweizerische Naturforschende Gesellschaft, Verhandlungen*, 134:109–110, **1954. DWB, DLC**—In the Swiss meteorological observation network, temperature and humidity measurements are mostly (90%) carried out in tin casing installed on the northwest wall of the building. In addition, some stations have English shelters (closed wooden casings with double shutters) or Wild casings (open metal casings). A comparative survey of the effect of these various casings on the accuracy of the measurement, as compared with the readings of an Assman psychrometer installed at 1.0 mi height on the northern wall of the central building, carried out in 1953, have shown that house installations and the

English screens provide comparable and rather correct readings. But the Wild casings prov excessive recordings in summer and in sunshine. They should, therefore, be replaced in the n future by English screens. *Subject Heading:* **1. Instrument shelters.**—*A.M.P.*

10L–161 551.508

*Waibel, Karl (*Feldberg Observatory*), **Vergleichsmessungen von Temperatur und Feuchte Observatorium Feldberg/Schw.** [Comparative measurement of temperature and humidity at t Feldberg/Swabia Observatory.] *Baden. Landeswetterdienst, Jahresbericht mit Abhandlungen*, 19 1952. p. 193–204. 10 tables, 2 refs. **DWB**—Comparative measurements were made over t period of 12 months in an English screen, a Norwegian screen, both over natural grass cover, an third screen located on a tower, covered with asphalt. The results are compared with measureme made on the tower directly in the wind. *Subject Headings:* **1. Instrument shelters 2. Instrume shelter comparisons 3. Tower observations 4. Feldberg/Swabia Observatory, Southweste Germany.**—*A.A.*

10L–162 551.508.

*Yamamoto, Yūzō (*Centr. Met. Obs., Japan*), **The mean air temperature in a simple thermomet screen (2nd report); an example of a simple equipment for temperature observation.** *Japa Meteorological Agency, Tokyo, Memoirs of Industrial Meteorology*, 16(1):59–63, Aug. **1952.** 7 fi In Japanese; English summary p. 3–4. **DWB**—Experimental measurements made with a th mometer placed in a simple screen (described earlier) are reported. The screen was installed on t north side of a building. Data obtained in this screen and in an ordinary screen at the regul observation site, are presented and compared. Temperatures are found to be generally lower in t experimental screen, the annual mean temperature difference being 0.7°C. Largest differenc occur in the period Aug.–Dec. *Subject Headings:* **1. Instrument shelters 2. Temperature measur ments.**—*G.T.*

MISCELLANEOUS (551.508.29)

Frozen Soil Meters

10L–163 551.508.29:551.525

*Krhounek, Slavomír, **Promrzání půd a jejich měření půdním mrazoměrem.** [Penetration frost into the soil and its measurement with soil freezing meters.] *Meteorologické Zprávy*, Pragu 8(5):127–133, **1955.** 10 figs., 2 tables. **DWB**—Comparative measurements made with variou models of a rubber tube type soil freezing meter are reported. The rubber tube, filled with wate is inserted into the soil by means of a protective metal casing. The length of ice forming in the tub shows the depth of freezing soil. Results obtained with each freezing meter model are compare with actual frost penetration (determined by digging) and the most suitable model is selected. So freezing values obtained in Bohemia in Feb. and March 1955 are also presented in conjunction wit atmospheric temperature at 2 m and ground level, and snow cover depth. *Subject Headings:* **1. Fro penetration in soil 2. Soil freezing meters 3. Soil freezing data 4. Bohemia.**—*G.T.*

10L–164 551.508.29:551.525

Mason, William C. (*Elec. Engr., Slingerlands, N. Y.*) and Ruggles, Frederick H., Jr. (*U. S Geological Survey, Albany, N. Y.*), **A very unique method of measuring frost depths in the ground** *Eastern Snow Conference, Proceedings*, v. 2, **1953–1954.** p. 15–16. (Abstract only.)) **DWB**— Frost depths can be recorded automatically by means of a motor driven rack, which closes an electri circuit as soon as it touches the lower surface of ice frozen in a water filled pipe, located in the soi *Subject Headings:* **1. Frost depth recorders 2. Frozen ground.**—*A.A.*

10L–165 551.508.29:551.525.

Potzger, J. E. (*Dept. of Botany, Butler Univ., Indianapolis, Indiana*), **A borer for sampling i permafrost.** *Ecology*, Durham, N. C., 36(1):161, Jan. **1955. DLC**—A description and photograp of the Courtemanche permafrost borer are presented. Also a brief description of the Pehelince borer is given. *Subject Heading:* **1. Permafrost depth measurement instruments.**—*I.L.D.*

Heat Flow Meters

10L–166 551.508.2

Gerhardt, J. R., **Albrecht and Gier and Dunkle heat flow meters—University of Texas.** (In Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamo Press, **1957.** Vol. 1:69–78. fig., 3 tables, 4 refs., 8 eqs.) **DWB**—The contents of this paper are a

llows: description of the installation of the Albrecht heat flux meter and of Gier and Dunkle flat-ate heat flow meters; the operation of the Albrecht type heat flux meter expressed by the equation r evaluating the surface heat flux from this type of meter, namely:

$$S_0 = \lambda_1(1 + T'_{0.5}/T'_{1.5})(T_{0.5} = 2T_{1.5} + T_{2.5}) + \lambda_2(T_{1.5} - T_{2.5});$$

he determination of whether or not the vertical array of thermistors in the Albrecht type meter terferes with the vertical flow of heat in the soil; and the evaluation and significance of computed rface soil heat flux, namely evaluation based on a depth varying thermal conductivity, evaluation ased on the extrapolation of classical heat theory and evaluation based upon $\rho cT'$ summation. *ubject Heading:* **1. Heat flow meters.**—*I.L.D.*

10L–167 551.508.29:551.578.46

*Kolesnikov, A. G. and Speranskaia, A. A., **Pribor dlia opredeleniia teplovykh potokov.** [Device or determining heat flow.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 11:1351–1359, Nov. 958. 8 figs., refs., 19 eqs. **DLC**—The authors describe the construction, calibration and use of a evice for measuring continuously heat currents in ice and snow covers, in soil, and at the bottom of servoirs. The theoretical basis of the method is the assumption that if a thin layer of thickness, δ, isolated at a given depth z from the surface in the medium being investigated (soil, ice and snow over) the flow of heat passing through the layer can be determined if the temperature gradient and efficient of heat conductivity of the medium are known. The simplest case of the propagation of emperature oscillations in the soil is examined theoretically. The estimation of the error in the easurement of heat flow by the heat measuring device, resulting from the fact that the device does ot measure the true flow of heat in the medium but the heat passing through itself, is examined eoretically. The apparatus, described with the aid of a diagram and a photograph, is a battery onsisting of 1000 small nickel constantan thermocouples, with wires 0.4 mm in diameter, arranged in equence, evenly "suturing" the plate through the plexiglass; the even joints issue on one side of the late and the uneven ones on the other. The calibration is described with the aid of diagrams, and ormulas are developed for determining the current passing through the upper and lower heat meters. Results of measurements carried out with the heat meter on the heat flow in a snow cover of a reservoir re presented and they indicate the accuracy and simplicity of the method. *Subject Headings:* **. Heat flow meters 2. Heat flow measurements.**—*I.L.D.*

Soil Temperature Measurement Instruments

10L–168 551.508.29:631.43:536.24

Staley, R. C. and Gerhardt, J. R., **Soil heat flux measurements.** (In: Lettau, H. H. and Davidson, Ben. (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1: 58–63. refs., 8 eqs.) **DWB**—The principles, advantages and disadvantages of the plate method and of the emperature gradient method for measuring heat flow are presented. This is followed by a presentation of the theory of the summation or "Temperature Integral Method" for evaluating surface soil eat flux by means of the equation:

$$S_0 = (\rho cT')_{0.5} + (\rho cT')_{1.5} + \cdots (\rho cT')_D$$

he reduction of subsoil heat flux to surface values by the "Temperature Integral Method" involves he use of the relationship

$$\rho cT' = (\lambda T')' \approx \lambda T''$$

o convert from the ρc to the λ parameter assuming that $\lambda' \approx 0$ and the equation

$$S_0 = (\lambda T'')_{0 \text{ to } 1.0} + (\lambda T'')_{1.0 \text{ to } 2.0} + (\lambda T'')_{2.0}.$$

The soil surface heat flux values are given in Vol. 2 and the differences between the measurements of the University of Wisconsin and Johns Hopkins University values are discussed. *Subject Headings:* **1. Soil heat flow meters 2. Heat transfer in soil 3. Soil heat conductivity.**—*I.L.D.*

10L–169 631.43:536.24:551.508.29

Buettner, K.; Staley, R. C. and Morse, B. E., **Thermal conductivity—University of Texas.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:29–38, 4 figs., 7 refs., 2 eqs.) **DWB**—A brief description of the two element method of measurement of soil thermal conductivity in situ based upon an instrument designed by F. Albrecht and an account of its deficiencies is followed by a detailed discussion of the single element method, which involves the use of "one small cylindrically shaped element containing a thermal sensing element as a core and a spirally wound heater coil surrounding the thermometer."

The mathematical development of the single element method is presented and a description of th instrument, a U-shaped Albrecht type flux meter, and of its circuitry is given with the aid of diagram and a photograph. The instrumental error, the induction material, the possible heat conductio through the Bakelite frame and the characteristics of the data recorded (presented in Vol. 2) a discussed. *Subject Heading:* **1. Soil heat and conductivity meters.**—*I.L.D.*

10L–170 631.43:536.24:551.508.2

Buettner, K. (*Univ. of Washington, Seattle*), **Local variability of thermal conductivity—Uni versity of Texas.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's firs mile.** N. Y., Pergamon Press, **1957.** Vol. 1:46–49. 2 figs., ref.) **DWB**—The author describes t construction of the Buettner-Bahn portable λ-meter for determining soil thermal conductivity in sit It "consists of a stainless steel hypodermic needle 2.5 cm long and 0.07 cm outside diameter. I serted in the needle base with terminals in the base of the needle was a 2.5 cm loop of enamele resistance wire (total resistance 4.5 ohms) to be used as a heat source." The thermocouple princip was used as a thermal sensing device. A diagram of the instrument is presented. Its calibratio is outlined and the method of measurement and the results obtained are discussed. A graph given, showing the frequency distributions of 171 observations of soil thermal conductivity with t portable λ-meter at O'Neill, Nebr. *Subject Headings:* **1. Soil heat conductivity meters 2. O'Neil Nebr.**—*I.L.D.*

10L–171 551.508.29:551.525.

Portman, Donald J. (*Univ. of Michigan, Mich.*), **Soil temperature instrumentation.** (In Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamo Press, **1957.** Vol. 1:17–18. table.) **DWB**—Soil temperatures at various depths were measure during the Great Plains Field Program at O'Neill, Nebr. Soil temperatures are important in studie of atmospheric turbulence because fluctuations in air flow near the ground are thermally as well a frictionally induced and the temperature of the soil surface is related closely to that of the air tem perature; they are important also in studying the role of temperature in the energy balance at th soil surface. Of the problems encountered in obtaining accurate soil temperature, the following ar considered: proper space sampling, placing of sensing elements at known depths with a minimum o disturbance to the natural soil conditions and instrumental accuracy. A table giving a summar of soil temperatures at O'Neill is included. *Subject Headings:* **1. Soil temperature measurement 2. Soil temperature measurement instruments 3. O'Neill, Nebr.**—*I.L.D.*

10L–172 551.508.29:551.525.

Portman, Donald J. (*Univ. of Michigan, Mich.*), **Soil thermocouples—Johns Hopkins University** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Per gamon Press, **1957.** Vol. 1:19–20. fig.) **DWB**—At the Johns Hopkins University site near O'Neill soil temperatures were measured at depths 2.5–80 cm with copper-constantan thermojunctions. A description is given of the construction of the junctions for the various depths, the installation of the thermocouples and the heat flow plate (illustrated by means of a diagram) and the method of ob servation. *Subject Headings:* **1. Soil thermocouples 2. Soil temperature measurement techniques** —*I.L.D.*

10L–173 551.508.29:551.525.4

Portman, Donald J. (*Univ. of Mich. Res. Inst., Michigan*), **Conductivity and length relationships in heat-flow transducer performance.** *American Geophysical Union, Transactions*, 39(6):1089–1094 Dec. **1958.** 4 figs., 9 refs., 15 eqs. **DWB, DLC**—In recent years many investigators have used thermoelectric heat flow transducers to measure heat conduction in natural soil. If the transducer has thermal properties different from those of the soil it will interfere with the natural heat transfer and an error in measurement will occur. An analysis of the error for a transducer placed in an infinite medium in steady state conditions is made in terms of two nondimensional parameters: (1) the ratio of transducer conductivity to soil conductivity, and (2) the ratio of transducer thickness to transducer width. An exponential relationship is postulated on the basis of physical considerations and is verified by the results of an electrical analogy experiment for a square transducer having a thickness-width ratio of 0.125 for conductivity ratios from about 0.1 to 2.2. An error of −70% was found for a conductivity ratio of 0.1 and an error of +5% for a conductivity ratio of 2.2. The results are used to estimate error in measurements made during the Great Plains Turbulence Field Program. *Subject Headings:* **1. Soil heat conductivity measurement 2. Heat-flow transducers.**—*Author's abstract.*

10L–174 551.508.29:551.525

Vasilishin, D. P., **Pochvennyĭ termoshchup elektroteplovoĭ kompensatsii.** [Soil thermosonde with electrothermal compensation.] *Meteorologiia i Gidrologiia*, Leningrad, No. 12, Dec. **1957.**

figs. (incl. photo). **DWB, DLC**—With the aid of a photograph and a diagram the author describes the construction, principle and operation of a portable thermosonde with thermal electrical compensation developed at the Zhitomir Agricultural Institute. It consists of the thermal probe which is a rigid metallic tube 1 m long with a cross section of 1.2 cm^2, a pointer galvanometer with a sensitivity of 10^{-6} amp, a mercury thermometer with a heat compensation device or Dewar flask, a storage cell with a capacity of 8 amp/hr, a sectional rheostat with approximate compensation, a solenoidal rheostat of exact compensation and a key. *Subject Headings:* **1. Soil thermosondes 2. Soil temperature measurement instruments.**—*I.L.D.*

10L–175 551.508.29:551.525.4:536.53

Rhoades, D. G. (*Geophysics Research Directorate*), **Soil thermocouples—University of California.** In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:25. ref.) **DWB**—The thermocouples used to measure soil temperature were the same as those employed in the University of California's frost protection work; they are described briefly. The placing of the sensing rod into the soil, which was a major problem, is described. The records of soil temperature at 1.3, 10 and 25 cm depths are given in Vol. 2. *Subject Heading:* **1. Soil thermocouples.**—*I.L.D.*

Temperature Gradient Meters

10L–176 551.508.29:536.532:551.524.4 551.510.62

*Hase, R., **Bestimmung der Refraktion bodennaher Luftschichten.** [Determination of the refraction of the atmospheric layers near the ground.] *Optik*, Stuttgart, 14(10):437–445, Oct. **1957.** figs., table, 9 refs. German and English summaries p. 437. **DLC**—The effect of vertical optical refraction in the surface layers of the atmosphere on the accuracy of high precision surveying or levelling is discussed. Measurements of the vertical temperature gradient near the ground are essential for making the proper corrections. Various thermoelectric devices for measuring surface temperature gradients are described and illustrated, and results shown in graphs and tables, and analyzed with respect to accuracy of meteorological and resulting errors in height observations. Recording equipment must be as free as possible from lag. Transportation difficulties for sensitive oscillographs are great but can be overcome by the simple temperature gradient meter described. *Subject Headings:* **1. Optical refraction near the ground 2. Surveying errors 3. Temperature gradient meters.**—*M.R.*

10L–177 551.508.29:551.524.77/78

Krechmer, S. I., **Polevoĭ gradientomer dlia izmereniia gradientov temperatury vozdukha.** [Field gradient meter for measuring air temperature gradients.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 22:96–99, **1957.** 3 figs., 4 refs. **DWB**—The author describes the construction, principles, and operation of a field gradient meter capable of measuring air temperatures, not only at the earth's surface but also during free balloon flights at elevations up to 3000 m. It consists of a temperature unit, a differential and galvanometer with a light counter. Diagrams showing the gradient meter, the fundamental scheme of the unbalanced bridge and the differential bridge are presented. *Subject Headings:* **1. Temperature gradient meters 2. Air-borne temperature recorders.**—*I.L.D.*

Thermistors

10L–178 551.508.29

Doyle, Barrett (*Iowa State College*), **Measurement and compensation of the lag of bead thermistors.** Iowa. State College of Agriculture and Mechanic Arts. Dept. of Physics, Contract AF 19(122)-440, Scientific Report No. 2, June 1, **1952.** 42 p. 15 figs., 9 refs., eqs. **DWB**—Various methods of measuring lag time of weak current thermistors, such as the advective, the radiative and the electrical heating method are analyzed and compared. Two techniques of electronic lag correction (by the use of an RC network and by the addition of a derivative) are discussed. Instruments used in these measurements and corrections are illustrated in diagrams and photographs and records obtained with them reproduced. A resistance temperature and a wind speed lag time curve are presented. *Subject Headings:* **1. Thermistors 2. Thermistor corrections.**—*G.T.*

10L–179 551.508.29

Goll, Gyorgy, **A termisztorhőmerők müködése.** [The functioning of thermistors.] *Időjárás*, Budapest, 62(6):344–347, Nov./Dec. **1958.** fig. English summary p. 344. **DLC**—On basis of the analysis of effects occurring during the use of thermistors which influence the measurements, the author states that calibration and measuring must be made with identical current intensity. With

this aim the most appropriate is the measurement on the basis of Ohm's law. However, the registr tions carried out with the aid of thermistors involve many difficulties even when executed in t above mentioned way. *Subject Heading:* **1. Thermistor calibration.**—*Author's summary.*

10L–180 551.508.29:551.5

*Höhne, Werner, **Theoretische Betrachtungen über die Verwendbarkeit von Halbleiter-Wide ständen in der Mikrometeorologie und -klimatologie.** [Theoretical considerations on the applic bility of semiconductor thermistors in micrometeorology and microclimatology.] *Zeitschrift f Meteorologie*, Berlin, 11(5/6):143–156, May/June **1957.** 65 refs., 31 eqs. **DWB, DLC**—The auth reviews the literature on the construction, manufacture and physical properties of thermisto (relationship of resistance to temperature) and considers their particular suitability in micrometeor logical and microclimatological measurements. A mathematical analysis is presented of the mo important factors leading to temperature errors, namely Joule's constant (warming up erron influence of the thermal electromotive force and the Petier effect, influence of radiation (radiatic error), influence of heat conduction in the leads and humidity. Also the spatial and tempor resolving capacity of thermistors are analyzed. It is shown that in respect to their form, in particul the small spherical thermistor, the thermistors do not possess a greater sensitivity in regard to t warming up error in bridge circuits than the ordinary resistance thermometer of platinum wir The reduction of the effect of various influencing magnitudes leads usually to greater difficultie in the case of thermistors than in fine wire metal resistance thermometers and thermal element *Subject Headings:* **1. Thermistors 2. Micrometeorological instruments.**—*Author's summary & I.L.D.*

10L–181 551.508.29:551.52

Jehn, K. H., **Soil thermistors—University of Texas.** (In: Lettau, H. H. and Davidson, Be (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:21–23. 2 figs table.) **DWB**—Soil temperatures at depths of 0.5 to 5.5 cm below the surface were obtained fro recordings of the Sanborn rod thermistors which are part of the Albrecht type heat flux meter. Th calibration of the thermistors is described. Curves showing subsoil temperatures for particula days and a table giving soil temperatures in °C for Aug. 1953 at O'Neill, Nebr. are presented. *Subje Headings:* **1. Soil thermistors 2. Soil temperature measurement techniques 3. Sanborn ro thermistor 4. O'Neill, Nebr.**—*I.L.D.*

10L–182 551.508.2

Jehn, K. H., **Shielded thermistors—University of Texas.** (In: Lettau, H. H. and Davidson Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:171 2 refs.) **DWB**—The thermistors were shielded above and below the ground by aluminum disc (Staley, R. C., *A.M.S., Bull.*, 33:67–72, **1952,** *see* 4.3–58, March 1953, *MAB*). The four selecte thermistors were calibrated before and after the field tests yielding the minimum uncertainty possibl with this type of measurement, namely about 0.2°C. The data presentation is discussed briefl (data in Vol. 2). *Subject Heading:* **1. Shielded thermistors.**—*I.L.D.*

10L–183 551.508.2

Paracchini, Salvatore and Vacca, Giuseppe, **Termistori adattati per misure di temperatur dell'aria al suolo.** [Thermistors adapted to measurements of atmospheric surface temperatures. *Rivista di Meteorologia Aeronautica*, Rome, 17(2):21–26, April/June **1957.** 3 figs., 5 foot-refs Italian, French, English and German summaries p. 21. **DLC**—A method is described for remot psychrometric readings, by use of appropriate thermistors allowing one to get measurements with a inertia equivalent to that of ordinary psychrometric thermometers, of the August type. *Subje Heading:* **1. Thermistors.**—*Authors' abstract.*

10L–184 551.508.2

Stewart, R. M., Jr. and Kassander, A. R., Jr., **Fast response thermistors—Iowa State College** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamo Press, **1957.** Vol. 1:205–215. 3 figs., 7 refs.) **DWB**—A description of the temperature instru mentation used by Iowa State College during the Great Plains Turbulence Field Program. A de tailed description is given of the sensing device which is a bead thermistor including its construction lag time, nonlinear temperature resistance; the calibration of the thermistor and the sources of erro of the field arc of the thermistors, and of the temperature recorder and the playback system. Th data analysis including the presentation of the output in the form of an analog voltage signal to a automatic tabulator, the sampling of the signal periodicities by the tabulator, the sources of erro arising in the analysis, etc. are discussed. *Subject Heading:* **1. Thermistors.**—*I.L.D.*

10L–185 551.508.29

Taylor, J. G., **Thermistors.** *Agricultural Engineering*, 33(8):502, Aug. **1952.** fig., 5 refs. **DLC**—Short general description of new type thermistor. Recommended for use in living plants and animals. Temperature change of 5.10^{-4} °C can be indicated. Measurement of infrared radiation possible by means of matched pairs. Addresses of manufacturers and distributors are given. *Subject Heading:* **1. Thermistors.**—*A.A.*

Thermocouples

10L–186 551.508.29:536.53

Cramer, H. E.; Gill, G. C. and Record, F. A., **Aspirated thermocouples—Massachusetts Institute of Technology,** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:172–175. 2 figs., ref.) **DWB**—The authors describe the instrumentation used to measure mean air temperature at four levels on a 55 ft tower with artificially ventilated copper-constantan thermocouples. "Thermoelectric voltages produced by differences in temperature between the ventilated thermocouples and a reference both were programmed through a dc amplifier by a stepping switch, output of the amplifier being fed into a recording milliammeter." The instrumentation including the thermojunctions, leads, shields, reference function and amplifier and recorder system is described in detail. The performance, the calibration of the thermocouples and auxiliary amplifier and data evaluation are discussed. *Subject Headings:* **1. Thermocouples 2. Tower observation.**—*I.L.D.*

10L–187 551.508.29:536.53

Cramer, H. E.; Gill, G. C. and Record, F. A., **Fast response thermocouples—Massachusetts Institute of Technology.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:216–219. fig., 2 refs.) **DWB**—A description of the instrumentation used to measure fluctuations in air temperature. It consisted of artificially ventilated thermocouples formed of butt-welded copper-constantan wires and portable type mirror galvanometers which served as indicating meters. The calibration and performance of the various elements and the evaluation of the temperature response observations are described. *Subject Headings:* **1. Thermocouples 2. Temperature fluctuation measurement instruments.**—*I.L.D.*

10L–188 551.508.29:536.53

Zakrent, Stefan, **Termopara i jej zastosowanie. Z cyklu, Poznajemy przyrządy meteorologiczne.** [Thermoelectric couple and its application. From the cycle, Let us get acquainted with meteorological instruments.] *Gazeta Obserwatora, PIHM*, Warsaw, 4(4):10–14, April **1951.** 10 figs. **DLC**—A rather technical paper describing the structure and the method of working of a thermoelectric couple adapted for the measurement of temperatures of very small areas as plant parts, man's skin, or the interior temperature of very fine tubes. The same principle was used by K. Ångström for his pyrheliometer. *Subject Heading:* **1. Thermocouples.**—*A.M.P.*

Others

10L–189 551.508.29:551.524:628.8

Barnes, R. S., **The temperature control of a fluid stream.** *Journal of Scientific Instruments*, London, 32(11):448–449, Nov. **1955.** ref. **DWB**—Apparatus, consisting of a heater with two series resistors forming two arms of a Wheatstone bridge, is placed in a fluid stream so that the fluid flows past the nickel/chromium resistor first and the platinum resistor (or thermometer) which can be controlled by the electronic control system later. This system can be used to heat an air stream flowing with speeds up to 1 m/s when the switching period of the controller was <0.2 sec with temperature control $<\pm 1$°C at temperatures up to 400°C. *Subject Heading:* **1. Temperature control instruments.**—*M.R.*

10L–190 551.508.29

Behar, Manoel Felix de Mayo, **Pyrometry.** (In his: **The handbook of measurement and control.** Pittsburgh, **1951.** p. 107–120. 27 figs., 3 tables.) **DWB**—Thermoelectric pyrometry, as it is applied in industry, is discussed in detail, but only general principles of the total radiation pyrometry are presented. Visual optical pyrometry (measurement of high temperatures by eye) and autometric optical pyrometry (measurement of high temperatures by an electric eye) are also discussed. *Subject Headings:* **1. Pyrometry 2. Thermoelectric pyrometers.**—*A.A.*

10L–191 551.508.29:637.133.3

Halter, P., **Ein Pasteurisier-Temperaturschreiber.** [A pasteurization temperature recorder.] *Schweizerische Zeitschrift für Obst- und Weinbau*, Wädenswill, 67(22):563–564, Nov. 1, **1958.** **DA**—

Information about the trend of the temperature in containers during pasteurization is not readil available. The Sozius-Werke at Langelsheim-Harz have constructed a temperature recorder makin it possible to follow the different temperatures in containers during the pasteurization process. description of the apparatus is given. *Subject Heading:* **1. Pasteurization temperature recorde** —*A.V.*

10L–192 551.508.29:551.524.4:551.55

Iowa. State College of Agriculture and Mechanic Arts, **Investigations of turbulent temperatur fluctuations in the lower atmosphere.** Contract AF 19(122)-440, Final Report, July 15, 1954 8 p. **DWB** (M24 I64if)--The objectives of this contract consisted of experimental investigation and analysis of the turbulent fluctuations of the sensible heat content of the lowest atmospheri layers. This involved the design and construction of a 100 counter tabulator to record the fre quencies of the fluctuating meteorological variables and constructing correlation diagrams of tw variables; the development of thermistors with minimum time lag and radiational error; measure ment of horizontal and vertical temperature variations and analysis of vertical variation of therma diffusivity in the lower layers of the atmosphere. The previous reports of this contract are sum marized briefly. *Subject Headings:* **1. Turbulent temperature fluctuations 2. Turbulence recorders 3. Thermistors.**—*I.L.D.*

10L–193 536.5 551.508.29

†Jackson, R., **Newer methods of gas temperature measurement.** *British Coal Utilisation Research Association Monthly Bulletin*, 15(7):245–256, July **1951.** 70 refs.—Includes: thermocouples at high temperatures; hot wire methods; platinum resistance measurements, etc.; measurements of com position of burning or dissociating gases; gas density; sound velocity; and random noise in electric circuits. *Subject Headings:* **1. Temperature measurement instruments 2. Gas temperature meas urement.**—*C.E.P.B.*

10L–194 551.508.29:551.584

Reifferscheid, H., **Zur Methodik mikroklimatischer Messung.** [Methodology of microclimatic measurement.] *Germany. Deutscher Wetterdienst in der US-Zone, Berichte*, No. 32:108–109, **1952 DWB**—An apparatus for an almost simultaneous registration of the temperature in 30–40 different localities is briefly described. Thermoelements as measuring parts, photographic registration and a switch equipment similar to that in telephones are used. *Subject Headings:* **1. Micrometeorological instruments 2. Temperature measurement instruments.**—*A.A.*

10L–195 551.508.29:551.526.6

Richardson, William S. and Wilkins, Charles H., **An airborne radiation thermometer.** *Deep-Sea Research*, London, 5(1):62–71, May **1958.** 10 figs., 5 refs., 3 eqs. **DWB** —An air-borne radiation thermometer for use in measuring sea surface temperatures from aircraft is described. Infrared radiation from the water surface is compared to the radiation from a black body at known temperature within the instrument. The sensitivity is about 0.01°C. Errors attending such measurements are discussed, and several applications to oceanographic research are cited. *Subject Headings:* **1. Airborne radiation thermometers 2. Sea surface temperature measurement.**—*Authors' abstract.*

INSTRUMENTS FOR DETERMINING ATMOSPHERIC PRESSURE (551.508.4)

BAROMETERS (551.508.41)

10L–196 551.508.41(02)

Canada. Meteorological Div., **Pressure measurements with mercury barometers (Instrument Manual No. 10).** Its *CIR*-2485, INS-60, May 13, **1954.** 24 p. 7 figs. **DWB**—The construction, installation, reading, correction, calibration and reduction to sea level of mercury barometers and their readings, according to practice of the Canadian Meteorological Service, are outlined and instruments and their mounting illustrated. *Subject Headings:* **1. Mercury barometers 2. Barometer corrections 3. Instrument manuals 4. Canada.**—*M.R.*

10L–197 551.508.41

Gielessen, J. (*Brunswick*), **Über ein Normalbarometer neuerer Konstruktion.** [Description of the standard barometer of new design.] *Zeitschrift für Instrumentenkunde, Brunswick*, 65(4):63–65, April **1957.** 2 figs., 6 refs. **DWB**—In contrast to standard mercury barometers in use, the new standard barometer of the Physikalisch-Technische Bundesanstalt described by the author is simpler in construction and easier to use. In the measurement of altitude its error is at most 0.005 mm.

The position of mercury surface is determined by the distance of a point immediately above this surface from its reflected image. The point in the upper vessel is fixed, while that on the lower surface is mobile and is located at the end of a small measuring scale. In a given measurement position the distance between the points is determined. From this known distance, the scale displacement, and the distances of the points from the mercury surface, the pressure is calculated. The construction of the normal barometer which resembles the Sears and Clark instrument is described with the aid of a diagram and photograph. The distances of the points from their mirror images are measured with microscopes provided with an ocular micrometer. The error in determination of the mercury surface at a single reading amounts to 0.002 mm. In addition, there is a systematic error in the determination of the fundamental point distance which may be as high as 0.003 mm. *Subject Headings:* **1. Mercury barometers 2. Normal barometers.**—*I.L.D.*

10L–198 551.508.41

Levanto, Erkki Theodor, **New normal barometer.** *Suomalainen Tiedeakatemia, Helsinki, Toimituksia, Ser. A, Pt. 1, Mathematica-Physica*, No. 191, **1955.** 14 p. 3 figs., table, 6 refs. **DWB, DLC**—Also issued as *Helsinki. Universitet. Meteorologiska Institutet, Mitteilungen*, No. 76, **1955. DWB, DLC**—A normal barometer, constructed by the late author at the Univ. of Helsinki, Inst. of Meteorology according to a rational plan so that the total error would be <0.01 mm Hg, is described and illustrated. The vacuum gage is accurate to .001 mm; the temperature error <0.002 mm if the temperature of the column is read to .01°C; the capillary error <0.001 mm if a tube of 32 mm diameter is used; the microscope accuracy <0.001 mm; the scale errors <0.001 mm; and errors due to impurities <0.005 mm if mercury is frequently distilled. Each of these errors is discussed, observation techniques described, comparisons and other tests discussed and data tabulated, and a new model proposed, which minimizes diurnal variation of room temperature by using a temperature insulated room and photographic recording. *Subject Headings:* **1. Normal barometers 2. Barometer accuracy.**—*M.R.*

10L–199 551.508.41

Sanuki, M. and Shimizu, I. (*both, Japan Met. Agency, Tokyo*), **Report on the International comparison of barometers at Calcutta and Hong Kong.** *Geophysical Magazine*, Tokyo, 28(1):135–148, Aug. **1957.** tables, eqs. **DWB, DLC**—Japan's Sub-Regional Standard Barometer (Fortin mercurial, K. Suzuki No. 1319) is compared with the Regional Standard Barometer for Region II (Fortin mercurial, Newman No. 112), at Calcutta, and also with the proposed National Standard Barometers (a test barometer Negretti & Zambra No. 6726, and two Kew barometers, respectively F. Darton No. S3478/46, and Short & Mason No. S2832/43), at Hong Kong. The traveling comparison set is composed of two Fortin mercurial barometers and two aneroid ones. In compliance with the procedure issued by S. MULL, Chairman of Standing Working Group on Comparison of Barometers, RA II, the traveling barometers are compared with Japan's Sub-Regional Standard Barometer before and after the journey. The details of the comparison and results obtained are described. *Subject Heading:* **1. Barometer comparisons.**—*Authors' abstract.*

10L–200 551.508.41

Sanuki, M. (*Tokyo Univ.*) and Shimizu, I. (*Japan Met. Agency, Tokyo*), **Report on the international comparison of barometers at Peking.** *Geophysical Magazine*, Tokyo, 28(4):563–572, Sept. **1958.** tables, ref., eqs. **DWB, DLC**—Japan's Sub-Regional Standard Barometer (Fortin mercurial, K. Suzuki No. 1319) is compared with the National Standard Barometer of the People's Republic of China (Syphon mercurial, R. Fuess No. 674) at Peking by means of the traveling comparison set, which is composed of two Fortin mercurial barometers and two aneroid ones. In compliance with the procedure issued by S. MULL, Chairman of Standing Working Group on Comparison of Barometers, RA II, the traveling barometers are compared with Japan's Sub-Regional Standard Barometer before and after the journey. The details of the comparison and results obtained are described. *Subject Heading:* **1. Barometer comparisons.**—*Author's abstract.*

10L–201 551.508.41

Shimizu, I. (*Japan Metcorological Agency*) and Kimura, S. (*Meteorological Research Institute*), **Experimental determination of pressure deviations in barometer rooms due to high winds.** *Meteorological Society of Japan, Tokyo, Journal*, Ser. 2, 35(2):73–77, April **1957.** 8 figs. (incl. photos), 4 refs., 3 eqs. **DWB, DLC**—The pressure deviation from undisturbed ambient value within a barometer room due to high winds is tested in the wind tunnel using two room models: a rectangular parallelepiped box and a cylindrical one, both with several perforations on the walls simulating the actual conditions. It is found that it is hardly possible to correct the pressure deviations in an ordinary barometer room, because they show such a great variety. *Subject Headings:* **1. Barometer corrections 2. Wind effects on indoor pressure.**—*Authors' abstract.*

10L–202 551.508.41(26

Skelton, P. N., **The supply of marine barometers by the Meteorological Office.** *Marine Observer*, 25(168):88–90, April **1955.**—Account of the discussions and experiments, 1854–1856, which resulted in the selection of the Kew Pattern barometer for supply to ships, and a scheme for checking and certifying their accuracy. *Subject Heading:* **1. Marine barometers.**—*C.E.P.B.*

10L–203 551.508.41:53.08

Teddington, England. National Physical Laboratory, **Barometric tests and measurements.** Its *Test Pamphlet* (*Schedule of Fees*), No. 20, **1952.** 16 p. 4 tables. **DWB**—Details of calibration tests and tolerance tests for several kinds of barometers are given in this pamphlet. Tolerances for mercury barometers are given in tabular form. Routine tests of aneroid barometers and barographs are described. *Subject Headings:* **1. Barometer calibration 2. Barometer tolerance tests.**—*M.R.*

10L–204 551.508.41 533.4

Yngve, Victor H. (*Dept. of Physics, Univ. of Chicago*), **A logarithmic barometer.** *Review of Scientific Instruments*, 25(1):43–45, Jan. **1954.** 3 figs., 8 eqs. **DWB**—The design of a barometer is described which achieves a logarithmic response over a wide range of pressures by the use of two fluids and a tube of varying cross section. Application of the principle to barometers with other useful nonlinear scales is discussed. *Subject Headings:* **1. Barometers 2. Barometry.**—*Author's abstract.*

METALLIC BAROMETERS (ANEROIDS), BAROGRAPHS (551.508.43)

Altimeters and Aneroids used for altimetry

10L–205 551.508.43:629.13.052

Gracey, William (*Langley Aeronautical Laboratory, Langley Field, Va.*), **The measurement of pressure altitude on aircraft.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 4127, Oct. **1957.** 25 p. 5 figs., 2 tables, 10 refs., eq. **DLC**—The various errors which determine the accuracy of an altimeter system are discussed and numerical values are assigned to each error. A statistical method for combining the individual errors is described. The overall errors of altimeter installations are calculated for Mach numbers up to 1.0 and altitudes up to 40,000 ft. An indication of the means by which some of the errors can be reduced is given. Various systems of barometric reference are also discussed. *Subject Heading:* **1. Altimeter errors.**—*N.A.C.A. abstract.*

10L–206 551.508.43

Hamilton, R. A.; Biddle, C. A. and Sparks, B. W., **Surveying aneroids: their uses and limitations.** *Geographical Journal*, London, 123(4):481–498, Dec. **1957.** 3 figs., 2 eqs. **DLC**—Hamilton discusses surveying aneroids and their errors from the point of view of a meteorologist, Biddle from the viewpoint of a surveyor, and Sparks from the geomorphologist's viewpoint. Afterwards S. H. Shaw, P. A. Sheppard, K. R. Honick, Ronald Frith, F. Solari and others criticize and discuss the subject at great length: instrumental errors, errors in anticyclonic and in frontal or windy weather outside and instrumental temperature errors, interpolation errors, necessary accuracy for various purposes, use of upper air charts, rules for recording and calculating readings and data, use of aneroids with aerial photographs. *Subject Headings:* **1. Aneroid surveying 2. Aneroid barometer accuracy.**—*M.R.*

10L–207 551.508.43:551.547.1

Pellisari, L., **Nuovo altimetro barometrico.** [New barometric altimeter.] *Rivista di Meteorologia Aeronautica*, Rome, 17(2):66–67, April/June **1957.** **DLC**—The Garrett Corporation has announced the development of a new absolute altimeter which can record variations of 30 cm in height at sea level, or of 6 m at 18,000 ft. It is to be used in connection with automatic pilots. A new type of metallic diaphragm, as well as accurate construction, is responsible for the high precision of the instrument. *Subject Headings:* **1. Altimeters 2. Garrett altimeter.**—*M.R.*

10L–208 551.508.43:797.5

Raspet, August and Swartzberg, Mel, **The Peravia barograph for soaring performance studies.** *Soaring*, Memphis, Tenn., 15(2):6–7, March–April **1951.** **DLC**—A description of a relatively new barograph made by Peravia in Switzerland. The scale of the altitude trail does not vary with altitude and the trail is on a straight axis perpendicular to the time axis so that the altitude can be read off directly. Photographic illustrations of the instrument are given. Its application to the study of soaring is illustrated by a specific example. *Subject Headings:* **1. Barographs 2. Soaring.**—*I.L.D.*

10L–209 551.508.43:551.547.1

Los baroaltimetros y los procedimientos de reglaje altimétricos: introducción. [Altimeters and the methods of correction: introduction.] *Revista Nacional de Aeronautica*, Buenos Aires, 11(116):38-42, Nov. **1951.** 3 figs., 3 tables. **DWB**—Basic explanations on the use of altimeters and different "normal atmospheres." Influence of deviations from this norm on the readings of the instrument is discussed. *Subject Headings:* **1. Altimeters 2. Altimeter corrections.**—*A.A.*

10L–210 551.508.43

Sugimura, Arata, **Exact treatment of the barometer method.** *Tokyo Univ. Faculty of Science, Journal, Sec. 2, Geology, Mineralogy, Geography, Geophysics*, 9(2):325–329, Nov. 30, **1954.** 2 figs., 2 tables, 3 refs., eqs. **DWB**—A test is proposed for estimating the standard error in altimeter measurements. The method involves use of two aneroid barometers (one at a fixed location measuring pressure variations in time, and one at varying locations), and comparison of measurements with known altitudes. *Subject Heading:* **1. Altimeter errors.**—*G.T.*

10L–211 551.508.43:551.547.1

Wobus, Hermann B. (*U. S. Navy Weather Res. Facility, Norfolk, Va.*), **Pressure height computations from aircraft reconnaissance data.** (In: Technical Conference on Hurricanes, Miami Beach, Fla., 1958. **Proceedings.** [1958?] Section F4 [13 p.]. 5 tables.) **DWB** (M15.2 A512pr)—Development, design and operational test of the reliable pressure altitude computer along with an analysis of errors are presented in this paper. *Subject Headings:* **1. Pressure-height calculations 2. Pressure altimetry.**—*W.N.*

10L–212 551.508.43(26)

Baumbach, S., **Luftdruckmessungen auf See.** [Atmospheric pressure measurement at sea.] *Wetterlotse*, Hamburg, No. 90:136-145, July **1955.** 7 figs. **DLC**—Account of ships' barometers and methods of minimizing sources of error. Deals first with mercury barometers, effect of capillarity, incomplete vacuum, effect of air currents and temperature. Pumping is minimized by a constriction of the tube. Aneroid barometers and their advantages over mercury barometers, and ships' barographs, are described. Finally a diagram is given of the hypsometer (thermobarometer). *Subject Headings:* **1. Barometers 2. Aneroid barometers 3. Hypsometers 4. Pressure measurement at sea.**—*C.E.P.B.*

10L–213 551.508.43:551.541

Davis, P. A. (*Geophysics Research Directorate*), **Micro-variations of barometric pressure.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:120–122. ref.) **DWB**—The author describes the Paulin type aneroid barometer used to measure pressure variations at O'Neill, Nebr., its installation and its operation. The manner of recording the pressure variation and the analysis of the recorded data, which are presented in Vol. 2, the categories of the "Qualitative Index of Micro-Variations," etc. are discussed. *Subject Headings:* **1. Pressure microvariations 2. Aneroid barometers.**—*I.L.D.*

10L–214 551.508.43:551.541

Donn, William L., **The microbarovariograph: a new instrument for measuring minute atmospheric pressure variations.** *American Geophysical Union, Transactions*, 39(2):366–368, April **1958.** 4 figs. **DWB, DLC**—The Lamont Geological Observatory of Columbia University has invented a simple, compact ultrasensitive barograph which responds to small changes of pressure over any given range. The microbarovariograph is a small rate-of-change pressure recorder. Microbarovariographs are to be installed in Iceland, the Azores, Bermuda, Barbados, Ascension, St. Helena, Texas Tower No. 4, and Fire Island, N. Y. in connection with the IGY island observatory program. The microbarovariograph pressure unit is designed to study the propagation of internal waves in the atmosphere and the phenomena of wave coupling between the atmosphere and oceans. *Subject Heading:* **1. Microbarovariographs.**—*N.N.*

Barographs and Microbarographs

10L–215 551.508.43:551.541

*Pasechnik, I. P. and Fedoseenko, N. E. **Elektrodinamicheskii mikrobarograf s gal'vanometricheskoi registratsiei.** [Electrodynamic microbarograph with galvanometric recording.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.* No. 1:121–130, Jan. **1958.** 8 figs., 15 refs., 9 eqs. **DLC.** Transl. into English by Irving Emin in *Akademiia Nauk SSSR. Bulletin of the Academy of Sciences of the U.S.S.R. Geophysics Ser.*, No. 1:7175, Jan. 1958, pub. **1959.** 8 figs., etc. **DWB, DLC**—The authors describe the construction of a microbarograph developed by them, together with its calibra-

tion. They present records of microfluctuations of atmospheric pressure over a wide range of period from 2–3 sec to 15–20 min, and also examples of their relationship to seismic and meteorologic phenomena. The instrument, described with the aid of diagrams, consists of two models. In the EDMB-1 model the sensitive element responding to the external atmospheric pressure is an elastic membrane covering one wall of a hollow sealed chamber; in the EDMB-IV model the sensitive element is a set of special chambers. In all other respects the two models are similar. The equation of the frequency characteristics of the microbarograph is shown to be analogous to the equation of the frequency characteristic for an electrodynamic seismograph. Recordings of microfluctuations caused by wind velocity of 8 m/s and of microfluctuations with large periods obtained on a calm day, and a graph showing the predominant periods and amplitudes of atmospheric pressure microfluctuations at Darasun station in June 1954 are presented and discussed. *Subject Heading:* **1. Microbarographs.**—*I.L.D.*

10L–216 551.508.43:551.541

Suzuki, S., **Differential barograph.** *Journal of Meteorological Research*, Tokyo, 5(1):19–30, March **1953.** 6 figs., table, 19 eqs. In Japanese; English summary p. 19–20.—A microbarograph equipped with a 200 liter air reservoir, a water basin and a simple or double float system is described in detail and illustrated. This instrument registers (according to formulas explained in the paper) the differential quotient of atmospheric pressure with respect to time. Sample records are presented. *Subject Heading:* **1. Microbarographs.**—*G.T.*

10L–217 551.508.43

U. S. Weather Bureau, **The aneroid barometer.** Wash., D. C., April **1957.** 8 p. figs., 2 tables. **DWB** (M08.43 U587a)—Basic operational principles of mercurial and aneroid barometers and the uses of aneroid barometers are described for the benefit of amateur observers. A table of approximate reduction factors for the different seasons and an altitude-pressure table are included. *Subject Headings:* **1. Aneroid barometers 2. Mercury barometers.**—*G.T.*

10L–218 551.508.43 551.508.299

*Yajima, Y., **On the responses of differential barograph and differential thermograph.** *Journal of Meteorological Research*, Tokyo, 8(1):38–42, March **1956.** 7 figs., 4 tables, 2 refs., 10 eqs. In Japanese. **DWB, DLC**—Differential equation of static motion of recording pen of floating cylinder type differential barometer is examined at various barometric conditions to determine percent accuracy of differential values of barometric variations. Tabulation of relative response (of the instrument) and phase angle, and graphs showing relations between period of barometric variation, relative response and phase angle are given. Similar evaluation is made with thermoflak type differential thermograph, and results are tabulated. *Subject Headings:* **1. Differential recorders 2. Barographs 3. Thermographs.**—*J. Woo.*

OTHER INSTRUMENTS FOR DETERMINING ATMOSPHERIC PRESSURE (551.508.49)

10L–219 551.508.49

Behar, Manoel Felix de Mayo, **Pressure and vacuum.** (In his: **The handbook of measurement and control.** Pittsburgh, **1951.** p. 153–173. 17 figs., 11 tables.) **DWB**—General definitions and classification of pressure measuring instruments are given. Comprehensive table for pressure unit conversion factors are presented, as well as a list of instruments and their ranges of applicability. Principal features of instruments are discussed. *Subject Heading:* **1. Pressure measurement instruments.**—*A.A.*

10L–220 551.508.49:531.788

Bundke, W., **Ein neues technisches Gerät zur Messung niedriger Drucke.** [A new technical apparatus for measurement of low pressure.] *Umschau*, 53(24):742–743, Dec. 15, **1953.** 4 figs. **DWB**—A turbine between two concentric cylinders at different temperatures measures the difference of moments due to molecules from warm and cold surfaces. *Subject Heading:* **1. Low pressure measurement.**—*C.E.P.B.*

10L–221 551.508.49

Haenni & Cie. (*Jegenstorf, Switzerland*), **Manometres a ressort tubulaire et manometres a vide avec divisions élargies au début de l'échelle.** [Coil-spring and vacuum manometers with magnified divisions at the bottom of the scale.] *Les Nouvelles de Haenni*, Jegenstorf, No. 40, July/Aug. **1952.** 4 p. 4 figs. **DWB**—Manometers with variable scalar divisions are discussed and illustrated. They are found to be less useful, generally, than conventional types. *Subject Heading:* **1. Manometers.**—*G.T.*

10L–222 551.501.7:551.508.49

Liu, Vi-Cheng (*Michigan Univ.*), **On a Pitot tube method of upper atmosphere measurements.** *Journal of Geophysical Research*, Wash., D. C., 61(2, Pt. 1):171–178, June **1956.** 2 figs., 15 refs., eqs. **DLC**—The aerodynamic basis of using Pitot tube pressure at supersonic speeds as an indirect measurement of the upper atmospheric density, pressure, and temperature, up to 80 km, is discussed. A special means of deduction of these ambient variables from corresponding Pitot tube pressure and other relevant parameters is presented. A unique feature of the method is that it needs only the Pitot tube pressure and the corresponding forward velocity of the Pitot tube (assuming negligible atmospheric wind velocity) to determine the ambient variables. This simplification is made possible by invoking laws which describe the characteristic properties of the atmosphere. This simplification, in the physical sense, results in an integral equation for the ambient density. A special and effective method is developed for the solution of this equation. *Subject Headings:* **1. Upper air measurement 2. Pitot tube.**—*Author's abstract.*

10L–223 551.54:551.508.49

Rufener, F., **Pression constante dans les enceintes pour l'observation des chronomètres.** [Constant pressure in the enclosures for observation of chronometers.] *Geneva. Observatoire, Publications, Ser. A*, No. 55, **1957.** 12 p., 5 figs. **DLC**—An installation permitting the maintenance of the atmosphere of the chamber at a constant pressure has been studied at the Observatory of Geneva. The author describes successively the principle of the adopted system, its functioning and its control. *Subject Heading:* **1. Pressure control chambers.**—*A.V.*

10L–224 551.508.49

Svec, Harry J. and Gibbs, Dale S. (*Iowa St. Coll., Ames, Iowa*), **A recording mercurial manometer for the pressure range 0-760 mm of mercury.** *Review of Scientific Instruments*, 24(3):202–204, March **1953.** 4 figs. **DWB**—A recording mercurial manometer which covers the range 0–760 mm of Hg is presented. A Nichrome V or Chromel A resistance wire is concentrically positioned in the mercury column of a large bulb manometer. The resistance of this wire is part of a direct current bridge circuit with a recording potentiometer as the balance indicating device. An electrical circuit which is designed to handle a variety of experimental conditions is presented. *Subject Heading:* **1. Manometers.**—*Authors' abstract.*

10L–225 551.508.49

U. S. Weather Bureau, **Instruction manual for pressure jump indicator.** Prepared by the Instrumental Engineering Division. [1956?] 10 p. figs. (incl. photos). **DWB** (M08.4 U587i)—The contents of this manual are as follows: a general description of the pressure jump indicator; the components of the apparatus; location of the components; the assembly and mounting of the components; wiring; installation of detector with static wire; calibration; description of operation of the instrument, etc. Diagram of the instrument, its wiring and installation and photographs showing its installation and its structure are presented. *Subject Heading:* **1. Pressure jump indicators.**—*I.L.D.*

INSTRUMENTS FOR DETERMINING WIND (551.508.5)

WIND VANES (551.508.51)

10L–226 551.508.51

Laird, Charles A., **How to construct a simple wind vane.** *Weatherwise*, Boston, 11(4):128–129, Aug. **1958.** 3 figs. **DWB**—The details of constructing a home made all metal, sensitive and durable wind vane and support are described and illustrated. *Subject Headings:* **1. Wind vanes 2. Amateur weather stations.**—*M.R.*

10L–227 551.508.51

Mel'nikov, I. V., **Elektricheskaia ustanovka s batareĭnym pitaniem dlia osveshchenniia fliugera.** [Battery-powered lighting device for weathervanes.] *Meteorologiia i Gidrologiia*, No. 12:45–46, Dec. **1956.** fig. **DWB, DLC**—With the aid of a diagram the author describes the construction, operation and maintenance of a device to illuminate a wind vane. The device consists of three low voltage lamps and dry cell batteries. The type of lamps and batteries all of Soviet make, are specified. *Subject Heading:* **1. Wind vane lighting.**—*I.L.D.*

10L–228 551.508.51:621.38

*Moses, H. and Hilst, G. R., **Electronic wind vane—Argonne National Laboratory.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press,

1957. Vol. 1:243–247. 2 figs., 2 tables.) **DWB**—The Argonne electronic wind vane uses a sensiti element similar to a microphone to detect any deviation from the null position. Its construction described with the aid of a diagram which shows the wind following cylinder mounted vertically ar rotating about a vertical axis. The principle of the electronic wind vane, its operation, the recordi of wind speed and irregular position and its calibration are discussed. Data for analysis were selecte from measurements made during periods of thermal stability, well developed superadiabatic cond tions and transition conditions. The evaluation of the data is described and tables giving data frequency of occurrence of 1 sec average wind direction during CST period at O'Neill are presente *Subject Headings:* **1. Electronic wind vanes 2. O'Neill, Nebr.**—*I.L.D.*

10L–229 551.508.

Olbers, W., **Ein ungewohnlicher Herstellungsfehler bei einem Windmesser.** [An unusual erro in the manufacture of a wind recorder.] *Germany. Deutscher Wetterdienst. Instrumentenamt Ham burg, Hamburg, Technische Mitteilungen des Instrumentenwesens*, New Ser., No. 3:45–46, **1957. DW** —The principle of the construction of a wind direction recorder is described in which the rotations the wind vane are transmitted to two cylinders with a common axis each of which is provided with screw thread which activate two writing arms. Owing to the transmission of wind velocity in th middle of the housing the axis of the wind vane cannot be coupled directly with the axis of the cylinde so that a gear transmission must be used. An error involving a gear with 37 teeth instead of th usual 36 was found. In this case the wind direction was off by 10%. *Subject Heading:* **1. Win direction recorders.**—*I.L.D.*

10L–230 551.508.5

Sanuki, M., (*Japan Met. Agency*); Kimura, S. and Kato, H., (*both, Met. Res. Institute*), **Tim constant of a monoplane wind vane of which the moment of inertia and arm length are systematicall changed.** *Papers in Meteorology and Geophysics*, Tokyo, 8(3):232–235, Oct. **1957.** 2 figs., 2 refs eqs. English summary p. 232; Japanese summary p. 235. **DWB**—Eight monoplane wind van combinations with two arm lengths and four vane weights are tested in a wind tunnel concerning th time constant of their damped oscillation in the tunnel air current. The time constants are invest gated with respect to the arm length and moment of inertia, the vane form being kept constant. Th tested air current speed ranges from 5 to 20 m/s. *Subject Heading:* **1. Wind vanes.**—*Author's abstrac*

10L–231 551.508.5

Sanuki, M. (*Central Meteorological Observatory*); Kimura S.; Tsuda, N. and Toyama, S. (*al Met. Res. Institute, Tokyo*), **The time constants of biplane wind vanes, [Pt. 1].** *Papers in Mete orology and Geophysics*, Tokyo, 6(3/4):244–246, Jan. **1956.** 3 figs., ref. **Pt. 2,** *Ibid.*, 7(2):124–127 July **1956.** 4 figs., ref. **DWB**—In Pt. 1, biplane wind vanes with five interplane angles combine with two arm lengths are tested in a wind tunnel for investigations concerning the time constant c their damped oscillation in the tunnel current. The observations are carried out in four steps of win speed up to 20 m/s. The time constants are investigated with respect to the interplane angle an arm length of the vane combination. In Pt. 2, biplane wind vanes with four interplane angles and box wind vane of the German Fuess type are tested in the wind tunnel for investigations concernin the time constant of their damped oscillation in the tunnel current. The observation is carried ou in four steps of wind speed up to 20 m/s. The time constants are investigated with respect to th interplane angle and compared with that of the Fuess type which is rather inferior to the biplan type, contrary to the claims made by the manufacturer. *Subject Heading:* **1. Wind vanes.**—*Authors abstract.*

ANEMOMETERS (551.508.53/4 and 551.508.54)

Combined Anemometers

10L–232 551.508.53/4:621.31

Clink, W. L. and Vesso, J. J., **Remote recording wind system.** *Canada. Suffield Experimenta Station, Ralston, Alberta, Suffield Technical Paper*, No. 16, Feb. 28, **1952.** 2 p. 2 figs., 2 refs **DWB** (MO55 C212s)—A remote wind recording system has been developed using standard Meteoro logical Service of Canada equipment. A relay system was used to raise transmission impedance to value suitable for a 6 mi telephone line and current polarization to reduce line requirements to a two wire transmission line with a ground return. The system operated satisfactorily during the summe of 1951. *Subject Headings:* **1. Remote recording equipment 2. Wind recorders.**—*Authors' abstract*

10L–233 551.508.53/4:551.555.8:553.6

*Demon, L.; De Felice, P.; Gondet, H.; Pontier, L. and Kast, Y., **Recherches effectuées par l Section de Physique du Centre de Recherches Sahariennes en 1954, 1955 et 1956.** [Investigation

by the Physics Section of the Center of Saharan Research in 1954, 1955 and 1956.] *France. Centre National de la Recherche Scientifique, Journal des Recherches*, No. 38:30–63, March **1957.** 62 figs. (incl. photos), 10 tables, numerous eqs. **DLC**—The following subjects are reported on: (1) description of special equipment used in the study of sandstorms and the results obtained; (2) observations concerning the electric field created by sandstorms; (3) study of moisture contained in sand dunes, and the influence of rain; (4) description of a magnetic theodolite used to measure the different parameters of the geomagnetic field, especially the determination of the inclination, which can be made in several seconds, with an angular accuracy greater than 1 min.; (5) a potentiometer used as an accessory of the magnetometer. *Subject Headings:* **1. Sandstorms 2. Wind instruments.**—*N.N.*

10L–234 551.508.53/4

Glaser, Arnold H., **The rotating arm resolving anemometer.** Texas. Agricultural and Mechanical College. Dept. of Oceanography, Contract N7onr-48705, Project NR 082-111, Technical Report, No. 2, Aug. **1954.** 15 p. 4 figs., 11 refs., eqs. **DWB**—Various types of anemometers useful in measuring turbulence parameters are described, and the theory of the rotating arm resolving anemometer (aerodynamic properties, shearing stress, effect of cross wind and method of calculating velocities) treated. Mechanical features and electronic circuits are then described and illustrated. The performance as indicated during tests at O'Neill, Nebr., in Sept. 1953, in ordinary and in light winds, and in comparison with other instruments is discussed. A fluxmeter and a counter rotating arm system are proposed as future developments. The present instrument is somewhat crude, but can be improved. The main advantage is absolute linearity of the instrument output. In light winds it tends to set up its own wind field. *Subject Headings:* **1. Rotating arm resolving anemometers 2. Micrometeorological instruments 3. Wind recorders.**—*M.R.*

10L–235 551.508.53/4

Karmin, Irving (*Instrumentation consultant, New York*), **The resolving anemometer.** *American Meteorological Society, Bulletin*, 40(9):473–476, Sept. **1959.** 5 figs., ref. **DWB, DLC**—Available techniques are adapted to design an anemometer which records its output in digital form. The digital output from the anemometer permits rapid analysis of the data and also enables unattended operation of the instrument from a battery supply. The resulting anemometer records wind speeds 2.5 mph–25 mph and records wind directions within 5° of the true wind directions. *Subject Heading:* **1. Resolving anenometers.**—*Author's abstract.*

10L–236 551.508.53/4

Surazhskiĭ, D. Ia., **Novyĭ anemorumbometr (M-38).** [New M-38 anemorhumbometer.] *Meteorologiia i Gidrologiia*, Leningrad. No. 4:45–47, April **1957.** 3 figs. (incl. photos). **DWB, DLC.** Transl. into English available for reference, **DWB** (MO8.59 S961ne)—With the aid of photographs and a circuit diagram, the author describes an apparatus for measuring simultaneously mean wind velocity and wind direction. The underlying principle is the electrical measurement of these elements by means of inductional synchronization of the transmission of an alternating current which consists of two electrically connected and similar contact face Selryn motors. The advantage of such transmissions at a distance is the large synchronizing moment and small moment of inertia. Wind velocity is measured by a system of three conic cups turning in one direction. The axis of the system is connected to the Selryn motor by means of a reducer with a transmission ratio of 5600:1. The wind direction is measured by a two-bladed vane, the axis of which is connected directly with the rotor of the recumbometer. This network anemorhumbometer automatically measures mean wind velocity from 1 to 40 m/s at intervals of 2 or 10 min. It measures direction with a precision of ±5°. The wind velocity is measured with a precision of $\pm(0.5+0.05u_m)$ m/s where u_m = measured mean wind velocity. *Subject Headings:* **1. Anemorhumbometers 2. Cup anemometers.**—*I.L.D.*

10L–237 551.508.53/4:537.7 551.508.53/4:621.317.7

Surazhskiĭ, D. Ia., **Anemograph M-27.** [Anemograph M–27.] *Leningrad. Nauchno-Issledovatel'skiĭ Institut Gidrometeorologicheskogo Priborostroeniia, Trudy*, No. 5:98–106. **1957.** 6 figs. **DWB, DLC.** Also shorter version pub. in: *Meteorologiia i Gidrologiia*, Leningrad, No.4:42–44, April **1958.** 3 figs. **DWB, DLC.**—The problem of constructing an anemograph for measuring horizontal wind velocities within the range of 2–100 m/s is examined. In this anemograph mechanical deformations are transformed into electrical magnitudes by means of electrical wire resistances made of constantan. By using a bridge with four measuring elements the inertia is reduced to a minimum. The electrical diagram of the braked anemograph is presented and the problems of the exclusion of resonance, etc. are discussed. A description of the construction of the instrument including the braked anemograph receiver, the housing, mast, recorder, condensors, and connecting cables are described with the aid of photographs. The results of measurements with this anemograph are presented. The recording errors were not more than 6%; at a constant time not greater than 0.2 sec.

The recording part may be as much as 100 m from the braked anemometers. The frequency of wind gusts with velocities of 90–100 m/s can be studied with this instrument which has been used in Antarctica. *Subject Heading:* **1. Anemographs.**—*I.L.D.*

10L–238 551.508.53/4

Sanuki, M. (*Central Met. Obs., Tokyo*); Kimura, S. and Toyama, S. (*Met. Res. Inst., Tokyo*). **The final test of the anti-freezing combination wind vane and anemometer on the summit of Mt. Fuji.** *Papers in Meteorology and Geophysics*, Tokyo, 5(2):182–185, Sept. **1954.** 4 figs. (incl. photos), table, 2 refs.—The "speedovane" described in an earlier paper (*see* 6.4–55, April 1955, *MAB*) was tested in a wind tunnel with various torque loads and found to have better response than anti-freeze cup anemometers. *Subject Headings:* **1. Heated anemometers 2. Speedovane 3. Mt. Fuji, Japan.**—*Authors' abstract.*

10L–239 551.508.53/4

Sanuki, M. (*Central Meteorological Observatory*) and Kimura, S. (*Meteorological Research Inst.*). **Experiments on a marine combination wind vane and anemometer in pitching or rolling motion.** *Papers in Meteorology and Geophysics*, Tokyo, 5(1):35–40, April **1954.** 8 figs., 2 refs. **DWB**—A combination wind vane and anemometer model (Marine Speedovane) is tested in a wind tunnel, as to its mode of oscillation and variation of rotational speed in pitching or rolling motion caused by wind. According to this model experiment the pitching motion of a period of 8 sec (actual weather ship's value) has nothing to do with the indication of the wind vane, but it seriously affects the rotational speed of the anemometer windmill, which is oscillating with the same period as that of the pitching motion and with a certain phase lag. The mean rotational speed is found remarkably lower than that without pitching at the same wind speed. In the rolling motion of the same period, however, the mean rotational speed of the anemometer windmill agrees well with that without rolling at the same wind speed. No definite periodicity and phase lag of the rotation are found in this case except a certain band width of fluctuations. *Subject Headings:* **1. Wind vanes 2. Anemometers 3. Ocean rolling effects on wind instruments 4. Marine speedovane.**—*Authors' abstract.*

10L–240 551.508.53/4

Sanuki, M.; Kimura, S. and Baba, M. (*all, Tokyo Univ.*), **The start and stop characteristics of a pendulum anemometer.** *Papers in Meteorology and Geophysics*, Tokyo, 9(2):95–98, Dec. **1958.** 4 figs., ref. Japanese summary p. 98. **DWB**—The start and stop characteristics of a pendulum anemometer devised by the Swiss meteorologist H. Wild are tested in a wind tunnel and in free air. The anemometer is at present in use for routine meteorological observations in the People's Republic of China, being simple and sturdy in spite of some shortcomings discussed in the present paper. *Subject Heading:* **1. Pendulum anemometers.**—*Authors' abstract.*

Cup Anemometers

10L–241 551.508.54

Casella, C. F. and Co., Ltd., London, **Sensitive anemometer.** Its *Leaflet*, 796, [1953]. 7 p. photo, 3 refs. **DWB**—A cup anemometer capable of measuring wind speeds as low as 0.5 ft/s, and an electromagnetic counter connected with it are described and illustrated. *Subject Heading:* **1. Cup anemometers.**—*G.T.*

10L–242 551.508.54

Emerson, William J. (*Supt. Superior National Forest*), **Direct-reading anemometer for recording wind gusts.** *U. S. Forest Service, Fire Control Notes*, 15(3):46, July **1954.** **DWB**—A direct reading anemometer called the Galegage used to give immediate advice to seaplane pilots as to gustiness or wind speed, is described briefly. It is a 3-cup anemometer and transmitter mounted 100 ft above the ground on a mast near the seaplane base at Ely, Minn. in the Superior National Forest. *Subject Headings:* **1. Cup anemometers 2. Forest fire control flights 3. Galegage 4. Ely, Minn.**—*M.R.*

10L–243 551.508.54

Glaser, Arnold H. and Elliott, William P., **The Sanoya Robinson cup anemometer for micrometeorology.** Texas Agricultural and Mechanical College. Dept. of Oceanography, Contract AF 19(604)-997, Scientific Report No. 5, April, **1956.** 6 p. 4 figs., ref.—The Sanoya Robinson cup anemometer for micrometeorological research is a small, geared anemometer of the electrical contacting type, manufactured in Japan. Minimum and maximum speeds are rated at 0.9 m/s and 17 m/s respectively. At 5 m/s the instrument follows gusts of 1 sec fairly well. The balance of the cups is poor, but can be readily improved. Despite some lack of durability, the low price and good operation of this anemometer make it attractive for fair weather micrometeorological observations. *Subject*

Headings: **1. Sanoya Robinson cup anemometer 2. Micrometeorological observation.**—*Authors' abstract.*

10L–244 551.508.54:551.551

Horn, Lyle H. (*Met. Dept. Wisconsin Univ.*), **The relative performance of various cup anemometers in a gusty wind.** *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, Vienna, 9(2):231–237, **1958.** 4 figs., table, 8 refs., 3 eqs. German, English and French summaries p. 231–232. **DWB, DLC**—Wind data collected during the Great Plains Turbulence Field Experiment of 1953 are used to study the relative performances of various types of cup anemometers subjected to air flow of known gustiness. Scatter diagrams which relate differences in the indicated mean speeds of two anemometers to gustiness are prepared. Although the instruments compared represent a wide range of moments of inertia, no relationship between gustiness and anemometer performance is noted. This result is examined in light of Schrenk's parameter which describes anemometer performance. *Subject Headings:* **1. Cup anemometers 2. Gustiness measurement equipment 3. Anemometer comparisons.**—*Author's summary.*

10L–245 551.508.54

*Kawano, Y., **Robinson's factors for small rotors.** *Journal of Meteorological Research*, Tokyo, 6(6):205–206, July **1954.** 2 figs., table. In Japanese; English summary p. 205—Robinson's factors $\left(=\frac{\text{rotational velocity of cup-center}}{\text{wind velocity}}\right)$ for small rotors are measured in the C. M. O. wind tunnel by changing the strength of turbulence $\left(=P\frac{\sqrt{(\text{velocity fluctuation})^2}\times 100}{\Sigma \text{ wind velocity}}\right)$. The results are shown.—*Subject Headings:* **1. Wind measurement instruments 2. Robinson's factors 3. Cup anemometers.**—*Author's abstract.*

10L–246 551.508.54

Liana, Franciszek (*PIHM-Warsaw*), **Nowy anemometer prądów pionowych (Komunikat wstępny).** [New vertical current anemometer: preliminary report.] *Przegląd Geofizyczny*, Warsaw, 1(3/4): 213–214, **1956.** fig. **DWB, DLC**—A new rotation type anemometer is described and illustrated, which records vertical air motions having velocities of at least 12 cm/s. *Subject Headings:* **1. Rotation anemometers 2. Vertical anemometers.**—*G.T.*

10L–247 551.508.54

Rosser, J. A. (*Merchant Taylors' School Met. Society*), **A home-made wind speed recorder.** *Weather*, London, 13(12):412–414, Dec. **1958.** 2 figs. **DWB**—The instrument devised from meccano parts and a tin can by the author (and illustrated by a photograph and wiring diagram) produces an autographic record of wind speed averaged over periods of 30 min, from pulses of a cup anemometer. A pen arm, activated by a clock work controlled by an electromagnet rises to varying heights depending on the number of impulses from the anemometer contacts which occur during a 30 min period. Thus the tops of the vertical lines made by the pen form a curve of wind speed vs. time. Every 30 min the pen is quickly and automatically brought back to zero. *Subject Headings:* **1. Wind speed recorders 2. Anemographs 3. Cup anemometers 4. Amateur weather instruments.**—*M.R.*

10L–248 551.508.54

Sanuki, M. and Kimura, S., **Some aerodynamic aspects deduced for the start and stop experiment of three- and four-cup anemometer.** *Papers in Meteorology and Geophysics*, Tokyo, 5(2): 186–188, Sept. **1954.** 5 figs., 3 refs.—The 4-cup anemometer with 14 cm arm length and 8 cm cup diameter has been in use for a long time in Japan. KUNO and KAWANO of the Central Meteorological Office, Tokyo, designed numerous models of 3-cup anemometers and tested them in wind tunnels. The optimum was found to be a beaded 3-cup model with 10 cm arm length and 10 cm cup diameter. Recent tests by the authors on purely aerodynamic aspects are summarized and illustrated by curves based on wind tunnel tests. The drag coefficient $C_{\square}$ was found to be almost the same for 3- and 4-cup anemometers; the static torque coefficient $C_{c\square}$ was nearly double in the 4-cup over the 3-cup. Basic figures for 2 types where λo = speed ratio (reciprocal of rotational ratio) at free-running stage, R = arm length, Ro = radius of cup shell and I = the moment of inertia: 3-cup $\lambda o = 2.90$, $Ro = 0.05$ m, $R = 0.10$ m, $I = 0.00026$ kgms^2; 4-cup $\lambda o = 2.65$, $Ro = 0.04$ m, $R = 0.14$ m, $I = 0.00081$ kgms^2. *Subject Heading:* **1. Cup anemometers.**—*M.R.*

10L–249 551.508.54

Swioklo, Zdzisław, **Zaleznosć predkości wiatru w klatce meteorologicznej od predkosci na wysokosci wiatromierza stacyjnego.** [Dependence of the wind speed in a meteorological shelter on the speed of wind at the height of the station's wind gage.] *Poland. Państwowy Instytut Hydro-*

logiczno-Meteorologiczny, Wiadomości Służby Hydrologicznej i Meteorologicznej, 3(4):291–296, 19
2 figs., 4 tables, eq. Russian and French summaries p. 17–18. **DLC**—Describes and discusses t
methods of wind speed measurement with a Wild wind gage at 10 m height, with a rotation an
mometer at 2 m height, and of an Albrecht thermal anemometer in a meteorological shelter. T
following results were established: the maximum mean speed of winds, obtained on the basis of 1 m
measurements with prevailing winds exceeding 20 m/s at 10 m height, does not exceed 2 m/s at t
level of the shelter. *Subject Headings:* **1. Wind speed measurement instruments 2. Anemometer**
—*A.M.P.*

10L–250 551.508.54:551.510

Zaĭchikov, P. F. and Kraizheva, V. A., **Nekotorye rezul'taty issledovaniia raboty kryl'chatoĭ anemometra pri izmenenii plotnosti vozdukha.** [Some results of investigations on the performan of the windmill anemometer during changes in air density.] *Moscow. Tsentral'naia Aerolo cheskaia Observatoriia, Trudy*, No. 22:60–64, **1957.** 5 figs., 2 tables, 3 refs., 2 eqs. **DWB**—Vario equations expressing the relationship between the readings of a windmill anemometer and a density are presented and the existing disagreements regarding this relationship are sur marized. The dependence of the anemometer reading upon air density is expressed by the equati $W = An + B(\rho_0/\rho_z)^{\alpha}$, in which the power α can be determined experimentally. An experiment pressure chamber together with the appropriate instrumentation for measuring the movement of windmill anemometer in still air in the absence of any disturbing factors and the experiment procedures are described. Data giving the speed W of the air in cm/s and the corresponding rotatio of the arms, n/s for different ratios of air density at the ground to the air density in the pressu chamber are presented in a table and the relationship of n to W is shown as a straight lin $W = An + B_z$, and $B_z = B_0(\rho_0/\rho_z)^{0.8}$. The power α is determined by the equation

$$\alpha = \frac{l_g \frac{B_z}{B_0}}{l_g \frac{\rho_0}{\rho_z}}.$$

Insofar as the graphs for different densities are parallel straight lines a correction to the air velociti W is obtained with the aid of equation

$$k = \left[\left(\frac{\rho_0}{\rho_z}\right)^{0.8} - 1\right].$$

Subject Headings: **1. Windmill anemometers 2. Air density effects on anemometer reading** —*I.L.D.*

Hot Wire Anemometers

10L–251 551.508.54:551.508.2

*Benjamin, James E. and Fahien, R. W. **Simultaneous single element air temperature and velocit measurements.** *U. S. Atomic Energy Commission*, [*Publication*] *ISC*-909, June **1957.** 66 p 21 figs., 2 tables, foot refs., 10 eqs. Reproduced from typescript. **DWB** (MO8.29 U582s)—Th literature on hot wire anemometry and resistance wire thermometry was surveyed and the theor presented. Derivations of equations for relationships between temperature, resistance, velocity current and voltage are worked out; equipment and circuits described and illustrated; procedure outlined and results presented in tables and graphs. It is concluded that the theory is not adequat for predicting results. Sample calculation procedures and nomograms are appended. *Subjec Headings:* **1. Hot wire anemometry 2. Resistance thermometry 3. Air temperature and velocity measurement (simultaneous).**—*M.R.*

10L–252 551.508.54

†Billington, Ian J., **The hot-wire anemometer and its use in non-steady flow.** *Toronto. Univ Institute of Aerophysics, UTIA Technical Note*, No. 5, Sept. **1955.** 40 p. 42 figs., 24 refs., 89 eqs **DWB**—The thermal equilibrium and heat loss relationships for small diameter heated cylinders placed normal to an airstream are discussed. Some experimental results are presented for the heat loss of a hot wire in stationary gases. Procedures for the calibration of hot wires are given in some detail and typical calibration curves are shown. The design of an open jet hot wire calibration tunnel with a variable velocity and a low turbulence level is described. The sensitivity of a hot wire to small fluctuations is considered and the limitations to frequency response imposed by the finite thermal lag of the wire are pointed out. Methods of overcoming the thermal lag effect by compensation and by suppression are discussed. The use of hot wire probes in nonsteady shock tube flows is

onsidered. The typical response of a hot wire to traveling shock and expansion waves in a shock ube is presented as an illustration of the method. Procedures for the reduction of shock tube esults are outlined and a correction for the effect of the finite impedance of the wire heating current ource is developed. A simple circuit for the use of hot wires to measure the speed of a traveling hock wave is shown. A discussion is included on the general considerations influencing the design of hot wire probes and mounts. *Subject Heading:* **1. Hot wire anemometers.**—*Author's abstract.*

10L–253 551.508.54

Centkiewiecz, C., **O pewnym nowym typie wiatromierza sygnalizacyjnego.** [A new type of signaling anemometer.] *Poland. Państwowy Instytut Hydrologiczno-Meteorologiczny, Wiadomości Służby Hydrologicznej i Meteorologicznej*, 3(4):287–290, **1954.** 7 figs., eq. Russian and French summaries p. 290. **DLC**—The problem of signaling wind speeds, exceeding a certain speed determined beforehand, are of great importance especially in the exploitation and protection of certain technical installations and in the domain of flying and gliding sports. In this paper the author describes the structure and operation of a signaling anemometer devised and constructed at the Institute of Aerology at Legionowo near Warsaw. Special attention is directed to the three phase generator, the current of which is rectified by a selenium rectifier, arranged in the Graetz circuit. The stabilized tension of excitation guarantees the generation of a constant magnetic field close to ±0%. A circuit sets the alarm signal in operation within the limits of 3–31 m/s. The circuit is interrupted as soon as a determined wind speed is exceeded. Registration of wind speed with the aid of the described generator does not show any leveling influence of the bulky body of its rotor. *Subject Heading:* **1. Signaling anemometers.**—*A.M.P.*

10L–254 551.508.54:551.551

*Cooper, Ralph D. (*David Taylor Model Basin*), and Tulin, Marshall P. (*Office of Naval Research, Wash., D. C.*), **Turbulence measurements with the hot-wire anemometer.** *AGARDograph*, Paris, No. 12, Aug. **1955.** 58 p. figs. (incl. photos), 2 tables, 63+35 refs.—Discussion of theory of turbulence, turbulence measurements, the hot wire anemometry in high speed flow. Practical aspects are considered, literature is reviewed systematically, and experimental data are presented in outline form. *Subject Headings:* **1. Hot wire anemometry 2. Turbulence measurements.**—*M.R.*

10L–255 533.17:536.25:551.508.54

Corbett, J. W. and Watson, W. W. (*both, Sloane Physics Lab., Yale Univ.*), **Performance of a hot-wire thermal diffusion column.** *Physical Review*, N. Y., 101(2):519–522, Jan. **1956.** 4 figs., 3 tables, 7 refs., 4 eqs. **DLC**—The performance of a carefully constructed metal, hot wire thermal diffusion column is examined in the regions of laminar and turbulent gas flow in the column for several hot wire temperatures using the normal argon isotopic mixture as a column gas. A new experimental method is employed which simplifies and increases the accuracy of the experiment. At the lowest temperature examined, quantitative agreement with theory is observed without the use of a parasitic remixing factor. The effect of spacers on the center wire on column performance was also examined. No significant effect was observed, this being attributed to the careful construction of the column. *Subject Headings:* **1. Thermal diffusion 2. Hot wire anemometers.**—*Authors' abstract.*

10L–256 551.508.54

Cramer, H. E.; Gill, G. C. and Record, F. A., **Heated-thermocouple anemometers and light bivanes—Massachusetts Institute of Technology.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:233–242. 8 figs., 4 refs., 6 eqs.) **DWB**—The fast response instruments installed on the MIT 55 ft tower at O'Neill to measure fluctuations in total air motion consisted of bivanes to record changes in wind direction and heat thermocouple anemometers to measure fluctuations in wind speed. The characteristics of the sensing elements, the installation, operation and calibration of the bivanes and anemometer thermocouples are described with the aid of photographs, diagrams and graphs. The data processing, including the programming of the punch card data by IBM equipment is discussed. *Subject Headings:* **1. Thermocouple anemometers 2. Wind vanes 3. Tower observation techniques.**—*I.L.D.*

10L–257 551.508.54:534

Dosanjh, Darshan S. (*Johns Hopkins Univ., Dept. of Aeronaut.*), **Use of the hot-wire anemometer as a triggering and timing device for wave phenomena in a shock tube.** *Review of Scientific Instruments*, N. Y., 26(1):65–70, Jan. **1955.** 8 figs., 13 refs. **DLC**—The hot wire anemometer is principally used for turbulence investigations in both subsonic and supersonic flows. Its use has been extended to the observation of transient phenomena in shock tubes. Since its sensitivity to different phenomena varies, depending upon the operating conditions, the hot wire is quite well suited for timing very weak as well as strong traveling shock waves. A triggering and timing arrangement was developed pointing to further improvement. It was found that the hot wire trigger is a reliable

instrument under widely varying shock tube operations. *Subject Headings:* **1. Hot wire anemometer 2. Turbulence research 3. Wave phenomena in shock tube.**—*Author's abstract.*

10L–258 551.508.54:551.552:551.588

Hastings, Charles E. and Doyle, Raymond T., (*Hastings-Raydist, Inc., Hampton, Va.*), **Use of the compensated hot thermopile principle in industrial instrumentation.** 8 p. 15 figs., 9 refs. Paper presented to the 2nd Institute of Radio Engineers Instrumentation Conference, Atlanta, Ga., Dec. 5–7, **1956.**—Principle, operation and attempts to improve the thermal conductivity gage (using the hot thermopile principle, compensated for temperature and rate of change of temperature) for application to air velocity and air flow measurements in industry micrometeorology, etc., are outlined and illustrated. A field installation at Round Hill Field Station of MIT, and one for ventilation in Arctic clothing tests, air pollution control studies (Los Angeles), kiln drying of lumber, tobacco drying, etc. are cited and illustrated. *Subject Headings:* **1. Hot thermopile anemometers 2. Air flow measurement 3. Micrometeorological instrumentation.**—*M.R.*

10L–259 551.508.54

Janssen, J. M. L.; Ensing, L. and Van Erp, J. B., **A constant-temperature-operation hot-wire anemometer.** *Institute of Radio Engineers, Proceedings*, 47(4):555–567, April **1959.** 27 figs., 16 refs. 66 eqs. **DWB**—Behavior of hot wire instrument is analyzed using signal flow diagrams, especially for case of constant temperature operation anemometer, comprising dc bridge and dc differential amplifier; influence of static bridge unbalance and of amplifier's gain for in-phase input signals on overall dynamic characteristics is analyzed, and requirements for amplifier are derived; chopper stabilized amplifier is employed, which automatically maintains static bridge balance under all operating conditions. *Subject Heading:* **1. Hot wire anemometers.**—*Author's abstract.*

10L–260 551.508.54

Kemp, J. F., **Stable hot-wire anemometer for low speeds.** *American Society of Heating and Air Conditioning Engineers, Transactions*, 64:163–174, **1958.** 9 figs. (incl. photo), 5 refs., 7 eqs. **DWB**—A hot wire anemometer that operates successfully in all respects has been described. Its development, basic and theoretical considerations given to it and the accuracy of the entire system under constant ambient conditions as well as its variations in ambient conditions, have been discussed. For this instrument a stable thermoelectric element was developed and is described. *Subject Heading:* **1. Hot wire anemometers.**—*N.N.*

10L–261 551.508.54

Nami, Lorenzo and Paracchini, Salvatore, **Un anemografo elettrico a distanza adattato per la registrazione dei venti superiori ai 100 km/h.** [Electric anemograph adapted for remote recording of winds exceeding 100 km/hr.] *Rivista di Meteorologia Aeronautica*, Rome, 14(2):23–27, April/June **1954.** 6 figs. Italian, French, English and German summaries p. 23.—At least ten defects in the standard anemometer and wind recorder appear when measuring winds with gusts over 100 km/hr such as occur at mountain stations in the Mediterranean area. To remedy these defects an experimental model of the S.I.A.P. Age-U anemograph was installed on Mt. Serpeddi in Sardinia (1048 m/s.l) where winds of >150 km/hr have been recorded. The necessary modifications in the direction and speed mechanisms and electrical transmission equipment for remote recording, to make the instruments more robust, are outlined in detail and illustrated. *Subject Headings:* **1. Anemographs for high speed recording 2. Wind recorders 3. Mountain observation techniques 4. Mt. Serpeddi, Sardinia.**—*M.R.*

10L–262 551.508.54:551.508.29

Subrahmanyam, V. P. (*Dept. of Geophysics, Andhra Univ., Waltair*), **Thermistor anemometer.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(1):118–119, Jan. **1957.** fig., ref. **DWB, DLC**—The use of thermistors as anemometers (hot wire) is discussed and two types of heating (direct and indirect) considered. The work done by HALES of Bell Telephone Labs., and by Standard Telephones and Cables, Ltd., of London (L- and B-type thermistors) is reviewed. The latter types (L- and B-) will be very useful in micrometeorological anemometry. The B-type is more sensitive than the L. Both are illustrated. The lag in ordinary thermistors is considerable. If the glass tubes are broken open and the beads exposed to the air stream, they are even more sensitive. *Subject Headings:* **1. Thermistor anemometers 2. Hot wire anemometers.**—*M.R.*

Pressure Tube Anemometers

10L–263 551.508.53/4

Cohen, E. A. (*Div. of Met. Physics, Melbourne, Australia*), **The use of a ball point recording system on the Dines anemometer.** *Journal of Scientific Instruments*, London, 33(7):280–281,

July 1956. fig. **DLC**—Specifications are given for use of a commercially available ball point for automatic recording equipment designed for use over a long period (several months) without attention, or for rapidly moving recordings where the density of the trace varies if ordinary pens are used. *Subject Headings:* **1. Ball point recording equipment 2. Dines anemometer.**—*M.R.*

10L–264 551.508.53/4 621.395.61:534.321.9

Gavreau, Vladimir and Calaora, Albert, **Etalonnage absolu de tubes de Pitot et de microphones au moyen d'ultra-sons.** [Absolute calibration of Pitot tubes and microphones by means of ultrasounds.] *Annales des Télécommunications*, Paris, 13(5/6):153–158, May–June **1958.** 7 figs., 12 tables, 4 refs. **DLC**—A very accurate gaging process, utilizing an ultrasound emitted by a vibrating cylinder and picked up by a magnetostriction microphone, has been developed. This process permits direct testing of Pitot tubes in the case of low speeds (less than 3–4 m/s). The flowing speed of the fluid is determined by measuring the differences in phases by means of a cathodic phasemeter. This parameter also permits the measurement of the alternating speeds in the sound waves and infrasound waves. When these speeds are determined, one can easily compute the acoustical intensities. This method has been utilized for the absolute gaging of microphones with very low frequencies down to 300 Hz. *Subject Headings:* **1. Pitot tube calibration 2. Acoustical intensities measurement.**—*A.V.*

10L–265 551.508.53/4

Kawano, Y., **Temperature-compensated float for Dines' pressure tube anemometer.** *Journal of Meteorological Research*, Tokyo, 5(1):43–45, March **1953.** 3 figs. In Japanese; English summary p. 43.—Two "bellows" filled with ethyl alcohol are attached to the float as illustrated, to eliminate the buoyancy variation due to the temperature changes of water in the tank of the Dines pressure tube anemometer. *Subject Heading:* **1. Dines anemometer.**—*From author's abstract.*

10L–266 551.508.53/4

Miyake, T., **A note on the pressure tube anemometer.** *Journal of Meteorological Research*, Tokyo, 5(1):37–42, March **1953.** 3 figs., 4 refs., 15 eqs. In Japanese; English summary p. 37.—Limits of performance and errors of a Dines pressure-tube anemometer are calculated and specified. *Subject Heading:* **1. Dines anemometer.**—*G.T.*

10L–267 551.508.53/4

Sato, Yoshimasa and Hashimoto, Koshi, **Thermostatic equipment for a Dines anemometer.** *Journal of Meteorological Research*, Tokyo, 6(10/11):572–574, Dec. **1954.** 3 figs., 3 refs. In Japanese. **DWB**—The author describes a simple device to keep a Dines anemometer warm by hanging an electric lamp in the liquid tank during winter. *Subject Heading:* **1. Dines anemometer.**—*H.A.*

PILOT BALLOON THEODOLITES (551.508.56)

10L–268 551.508.56

Canada. Meteorological Div., **Askania balloon theodolite type GT 1.** Its *CIR*-2404, INS-57, Dec. 23, **1953.** 4 p. photo. **DWB**—The description of the construction and the methods of mounting, and orientation of the Askania balloon theodolite GT 1 notable for its compact and lightweight construction and the careful concealment of all sensitive parts. Photo of balloon is included. *Subject Headings:* **1. Askania balloon theodolite 2. Pilot balloon theodolites.**—*A.M.P.*

10L–269 551.508.56

Didenko, A. A., **Oborudovanie sharopilotnogo punkta.** [Equipment for the pilot-balloon site.] *Meteorologiia i Gidrologiia*, No. 1:43–44, Jan. **1957.** fig. **DWB, DLC**—A description of a specially constructed pilot balloon observation site at Frunze which facilitates the work of the observer. A metal tube implanted in a concrete base and having a height of 105 cm above the ground is used as a base for the theodolite. This tube is provided with attachment for a seat, container for writing equipment, etc. The structure of this permanent stand for the theodolite is illustrated by means of a diagram. *Subject Headings:* **1. Pilot balloon theodolites 2. Theodolite stands.**—*I.L.D.*

10L–270 551.508.56:551.578.46:551.43

Gordon, S. M., **Primenenie teodolita dlia opredeleniia vysoty sezonnoĭ snegovoĭ linii v gorakh.** [Use of a theodolite to determine the elevation of the seasonal snow line on mountains.] *Meteorologiia i Gidrologiia*, No. 4:54–57, April **1956.** 2 figs., 2 tables, 2 refs. **DWB, DLC**—The author describes the procedure for the use of an aerological theodolite to measure the height of the seasonal snow line on mountains and presents the formulas for calculating the height and determining the relative error. A comparison is made between determination of heights of snow lines by means of actual observation and by indirect calculation. Considerable difference was found between the two

procedures. *Subject Headings:* **1. Snow line height determination 2. Theodolite observation** —*I.L.D.*

10L–271 551.508.5

Singer, Bernard M. (*Geophysics Research Directorate*), **Double theodolite pibal wind measure ments.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y Pergamon Press, **1957.** Vol. 1:296–297. 6 eqs.) **DWB**—The two ML-47 theodolites were sepa rated by a bare line 1219 m in length oriented 281.0° from north and situated in the extreme west c the observation line; azimuth and elevation angles of relatively slow rising ballons released from th theodolite station were read to the nearest 0.1° at 15 sec intervals. The geometrical relationship determining the horizontal distances of balloons from the theodolites, the elevation angles of balloo from theodolites and the balloons' position are analyzed and represented by equations. The erron induced by the limits of visual accuracy are analyzed. *Subject Heading:* **1. Pilot balloon theodolites** —*I.L.D.*

BALLOON OR TARGET RADIO-DIRECTION FINDERS OR RADAR TRACKERS (551.508.57)

10L–272 551.508.57:551.508.822

Decca wind-finding radar. *The Scanner*, London, No. 17:2–5, **1955.** figs., photos. Also **Radar wind-finding reflector.** *Ibid.*, p. 6. **DWB** (Pamphlet coll.)—This report commends modern meteorological services and their aid in modern air flights. The role played internationally by Decca equipment in the field of wind finding was demonstrated in June 1956 at Payerne, Switzerland during the International Comparison of Radiosondes which was organized by the World Meteorological Organization. This paper describes the capabilities of this new Decca windfinder. Its achievements during the international equipment demonstrations at Payerne are cited. It is hoped that this economical equipment will soon play a great role in meteorological observations, and air navigation as well as remove hazards of jet stream and turbulence when properly used. *Subject Headings:* **1. Decca wind finding radar 2. Radar wind instruments 3. International radiosonde comparisons** —*N.N.*

10L–273 551.508.823:551.557.5

Gödecke, K., **Versuche zur Gewinnung von Netzreflektoren aus Nylon und die Erprobung von Draht-Reflektoren.** [Experiments on nylon net reflectors and tests with wire reflectors.] *Germany, Deutscher Wetterdienst. Instrumentenamt Hamburg, Hamburg, Technische Mitteilungen des Instrumentenwesens*, New Ser., No. 3:39 43, **1957.** 2 refs. **DWB**—The measurement of the maximum wind velocities or jet streams which occur at altitudes of 9–10 km requires the use of net targets with a good ascent velocity. Net targets rise about 25% more rapidly than paper targets and always reach the wind maximums in the troposphere and they are not weighted down by raindrops during rainfall to the same extent as paper targets. On the other hand, wire targets rise so rapidly that the fine structure of temperature and humidity is not measured accurately. The method used to silver nylon targets, and the properties of aluminum targets with wire net surface, taut wire targets, aluminum foil targets, British nylon targets, etc. are described. *Subject Headings:* **1. Wind measurement techniques 2. Nylon net targets 3. Wiresondes.**—*I.L.D.*

OTHER INSTRUMENTS FOR DETERMINING WIND (551.508.59)

Gustiness Instruments

10L–274 551.508.59:551.551

Halstead, M. H. (*Agricult. & Mech. College of Texas*), **Low level smoke puff—Johns Hopkins University.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:117–119. table, 2 refs.) **DWB**—The author describes the design and construction of a smoke generator for studying small scale diffusion processes and its installation and use during the Great Plains Turbulence Field Program at O'Neill, Nebraska. A table giving mean diurnal variations of low level smoke puff data is presented. *Subject Headings:* **1. Smoke generators 2. Smoke puff data 3. O'Neill, Nebr.**—*I.L.D.*

10L–275 551.508.59:551.551:551.510.42

Raynor, G. S. and Smith, M. E. (*both, Brookhaven Nat. Lab., Upton, Long Island, N. Y.*), **An analyzer and recorder for wind gustiness measurements in air pollution.** *Air Pollution Control Association, Proceedings*, Vol. 50, 1957. Issued **1958?** Paper No. 6 [5 p.] 8 figs., 7 refs. **DWB**

(M10.42 A298ap)—An analyzer and recorder system has been developed to translate the Brookhaven gustiness classification into a simple, reliable record, thereby eliminating both training and subjectivity from the analysis. The equipment can be operated successfully in conjunction with well exposed wind vanes at levels up to 400 ft above ground without alteration, and it is believed that it would give useful results at other sites. The analyzer, while complex, has the advantage of utilizing standard commercial parts for most of the major components. Portions of the instrument, such as the angular selectors and the ratio measurement system, are of interest in themselves, and may prove valuable in other applications. *Subject Headings:* **1. Gustiness measurement equipment 2. Atmospheric pollution measurement instruments.**—*Authors' summary.*

10L–276 551.508.59:551.551.2

Rutkowski, Walter and Fleisher, Aaron, **R-meter: an instrument for measuring gustiness.** Massachusetts Institute of Technology. Dept. of Meteorology, Contract DA-36-039-Sc-64472, Project DA 3-99-07-022, Research Report, No. 24, Oct. **1955.** 117 p. 4 figs., 4 refs., 16 eqs. **DWB.** Also shorter version issued as Weather Radar Conference, Sept. 1955, **Proceedings of the 5th Conference,** p. 255–260. pub. **1956.** 4 figs., 3 refs., eqs. **DWB**—The R-meter measures the rate that a fluctuating radar signal crosses a given level, thus making direct measurement of the "second central moment of the gust velocity distribution, which is the variance." Thus a rapid determination of the variance is possible at the expense of loss of some of the information. Theory, block digarams of equipment, operation and circuits are presented in text and figures. The appendix gives a theoretical demonstration of the relation between the rate of crossings as indicated on the R-meter, and the real gustiness distribution. Vertical wind shear also is involved in the equations. *Subject Headings:* **1. Gustiness meters 2. Radar signal variations 3. R-meter theory.**—*M.R.*

10L–277 551.508.59:551.551.5:629.13

Skatskiĭ, V. I. (*Geophys. Inst., Acad. Sci. USSR.*), **Electromekhanicheskiĭ akselerograf s p'ezokvartsevym datchikom.** [Electromechanical accelerograph with a quartz piezoelectric transducer.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 5:562–568, May **1956.** 8 figs. (incl. photo), 6 refs., 9 eqs. **DLC.** Shorter version in: Mezhvedomstvennaia Konferentsiia po Voprosam Issledovaniia Oblakov, Osadkov i Grozovogo Elektrichestva, 5th, Leningrad, 1956, **Issledovanie oblakov, osadkov i grozovogo elektrichestva.** Pub. **1957.** p. 183–184. 4 refs. **DLC** (QC921.M4 1956c)—With the aid of diagrams and a photograph and equations, the author describes the construction, theory, calibrations and use of an electrical accelerograph for measuring the additional load imposed upon aircraft by atmospheric turbulence. The results of observation with air accelerograph during flight are presented. *Subject Headings:* **1. Electromechanical accelerographs 2. Gust loads on airplanes.**—*I.L.D.*

Turbulence Instruments

10L–278 551.508.59:629.13:551.551

Bunker, Andrew F. and McCasland, Kenneth, **Description and installation of meteorological equipment aboard Navy PBY-6A, 46683.** Woods Hole Oceanographic Institution, Contract N6onr-27702 (NR-082-021), Technical Report No. 33, Nov. **1954.** 14 p. 11 figs., 5 refs. **DWB**—Details of instruments, circuit diagrams, ranges, sensitivity, and installation of various instruments used in studying horizontal and vertical turbulence components in clouds traversed by Navy PBY-6A under direction of Woods Hole personnel. These are psychrograph (thermistors), lithium chloride humidity setup, nine channel oscillograph and control panel, accelerometer, pressure anemometer, altimeter, altitude recorder, thermopile psychrograph, still and movie camera for photographing clouds, land and water features, wide angle camera, power supply and side marking system, compasses and radio. Photographs of some of the equipment mounted on airplane are included. *Subject Headings:* **1. Air-borne meteorological instruments 2. Turbulence recorders 3. PBY instrumentation.**—*M.R.*

10L–279 551.508.59:551.551

Ismailov, M. I. and Shvartsman, L. M., **Izmerenie skorosti i turbulentnykh pul'satsiĭ emkostnym ustroĭstvom.** [Measurement of speed and turbulent pulsations with a volumetric device.] *Akademiia Nauk Uzbekskoĭ SSR, Izvestiia, Ser. Fiziko-Matematicheskikh Nauk*, No. 2:51–55, **1958.** 5 figs. Uzbek summary p. 55. **DLC**—The author describes the construction, calibration and operation of a new apparatus for measuring simultaneously velocity and turbulent pulsations of non-isothermal air currents. This apparatus is based upon variations in volume and has a very small inertia. The velocity and pulsations of an air current act directly upon a nozzle and rod of a component, which directly transforms the mechanical displacement of the rod by an air current and consists of a variable condensor with an air dielectric. An electric current varies, corresponding to variations in volume, and the fluctuations are recorded on an oscillograph. Diagrams showing the

volume transformer, the measuring arrangement, the circuit of the generator, the rectifier of the high frequency current, etc., and the calibration curve are presented. From the oscillogram curve of the pulsation velocity of the air current the average velocity of turbulent movement for time $t = t_2 - t_1$ is given by $u_m = \frac{1}{t}\int_{t1}^{t2} u_t \cdot dt$, where u_t = pulsational velocity of air flow on the oscillogram. *Subject Headings:* **1. Wind instruments 2. Turbulence measurement techniques.**—*I.L.D.*

10L–280 551.508.59:551.551:551.507.352

Kovásznay, Leslie S. G. (*Johns Hopkins Univ.*), **Development of turbulence-measuring equipment.** *U. S. National Advisory Committee for Aeronautics, Report*, No. 1209, **1954.** 30 p. 47 figs. (incl. photos), tables, 14 refs., 32 eqs. **DWB**—Hot wire turbulence measuring equipment has been developed to meet the more stringent requirements involved in the measurement of fluctuations in flow parameters at supersonic velocities. The higher mean speed necessitates the resolution of higher frequency components than at low speed, and the relatively low turbulence level present at supersonic speed makes necessary an improved noise level for the equipment. The equipment covers the frequency range from 2 to about 70,000 cycles per sec. Constant current operation is employed. Compensation for hot wire lag is adjusted manually using square wave testing to indicate proper setting. These and other features make the equipment adaptable to all purpose turbulence work with improved utility and accuracy over that of older types of equipment. Sample measurements are given to demonstrate the performance. *Subject Headings:* **1. Turbulence instrumentation 2. Turbulence measurements 3. Air-borne instruments 4. Hot wire anemometers.**—*Author's abstract.*

10L–281 551.508.59:551.551:536.2

†Vehrencamp, John E., **Development of a boundary shear-stress meter.** California. Univ. Dept. of Engineering, Contract N6-onr-275, Task Order 6, Project NR-082-036, Report 52-22, Oct. **1952.** 48 p. 18 figs., eqs., 19 refs. **DWB**—Drag forces, exerted by the wind on the earth's surface, varying from 10^{-6} to 10^{-3} lb/sq ft can be measured by means of an electronic servomechanism, which controls a movable portion of the boundary. Device is nondirectional. The theory of such measurements is outlined and the construction of the shear stress instrument discussed in detail, giving photos, sketches and circuit diagrams. Laboratory performance is discussed, showing calibration, response and typical damping curve. *Subject Headings:* **1. Shear stress meters 2. Surface drag measurements.**—*A.A.*

PSYCHROMETERS, HYGROMETERS, HYGROGRAPHS (551.508.71)

Hygrometers

10L–282 551.508.71

Griffiths, E. (*Past Pres., Commission 2, Institute*), **Practical considerations of hygrometer principles.** *International Institute of Refrigeration, Bulletin*, Annex 1956-2. p. 251–259, **1956.** fig. **DLC**—Consideration is given to the various types of hygrometers now used in France and Great Britain and of the means of improving them for refrigeration work. Some present hygrometers date back to a period of over 100 yrs. A description of each of these new hygrometers is given in this communication under the following: the chemical and absorption methods for humidity measurement; the dewpoint hygrometer; the wet and dry bulb hygrometer; the mechanical hygrometers; the electrical resistance and capacitance hygrometers; the fog formation hygrometer; the color change hygrometer; the glycerine film hygrometer; the recording dielectric hygrometer for expired air; the diffusion hygrometer; the viscous drag hygrometer. Future research work is needed in order to determine the behavior of several of these hygrometers. Their descriptions contained in this article will be of much assistance to the future researchers in this field. *Subject Heading:* **1. Hygrometers.**—*N.N.*

Hair Hygrometers

10L–283 551.508.71:551.521

Pápai, László, **A hajszálas higrométerek nedvességfelvétele.** [Moisture capacity of hair hygrometers.] *Időjárás*, Budapest, 62(5):290–293, Sept./Oct. **1958.** 2 refs., eqs. English summary p. 290. **DLC**—The author states with the aid of an empirical formula that the hygroscopicity of the hairs used in hygrometers is caused by the pressure difference of the atmosphere and the air in the hairs. Attention is directed to protection of the hygrometers against radiation, because the radiation modifies the pressure difference, thus causing erroneous measurement results. *Subject Headings:* **1. Hair hygrometers 2. Radiation effect on hygrometers.**—*Author's abstract.*

10L–284 551.508.71

Sonntag, Dietrich, **Diagramme für die Änderung der Hygrometerskala mit der Temperatur.** [Diagram for changing the hygrometer scale according to temperature.] *Zeitschrift für Meteorologie*, Berlin, 11(8):244–246, Aug. **1957.** 2 figs., table, 8 refs. **DWB, DLC**—Correction diagrams for the variation of the hygrometers with normal and rolled hairs in order to determine the influence of temperature upon the hygrometer scale of these two types of hair. The rolled hair showed a smaller dependence upon temperature than did normal hair owing to its greater expansion from 0–100% relative humidity. The author presents a table giving apparent expansion coefficients of hair according to W. GRADMANN (in 10^6 degree^{-1} recalculated in this article against aluminum). Diagrams give the thermal correction of R in % for normal and rolled hair for given temperatures from $-60°$ to $+40°$C by using the expansion coefficient of W. GRADMANN. *Subject Headings:* **1. Hair hygrometers 2. Hygrometer calibration.**—*Author's summary and I.L.D.*

10L–285 551.508.71

Sonntag, Dietrich, **Skalenbestimmungen an Haarhygrometern mit normalen beziehungsweise mit gewalzten Haaren.** [Scale determinations on hair hygrometers with normal or rolled hair.] *Zeitschrift fur Meteorologie*, Berlin, 11(8):241–244, Aug. **1957.** 3 figs., 2 tables, 11 refs. **DWB, DLC**—The Gay-Lussac scale does not hold either for hygrometers with normal or rolled hair. Scale determinations were made on hygrometers with normal and rolled hair under conditions of decline of humidity. The normal hair deviates in the same sense from the Gay-Lussac law in a definite scattering region. Each hygrometer has its own scale; all show a deviation of ±1.4% from the mean curve. All hygrometers with rolled hair show the same scale. In the normal hair hygrometers the greatest deviation from the Gay-Lussac numbers is 6.6% and in those with rolled hair 11.5%. Older scale determinations made by SAUSSURE, AUGUST, MELLONI and KOPPE are discussed in relation to their deviations from the Gay-Lussac scale. Data are presented on length changes of normal and rolled hairs in % and deviations of the new scales of the normal and rolled hair from the Gay-Lussac scale in tables and graphs. *Subject Headings:* **1. Hair hygrometers 2. Hygrometer calibration.**—*I.L.D.*

10L–286 551.508.71:620.16:53.089.6

†Sonntag, Dietrich (*Institut für Gerätebau der Deutschen Akademie der Wissenschaften zu Berlin*), **Längen- und Gewichtsänderung des normalen und gewalzten Haares bei Feuchteänderungen.** [Length and weight variations of normal and rolled hair due to humidity changes.] *Zeitschrift für Meteorologie*, Berlin, 11(9):260–273, Sept. **1957.** 20 figs., 3 tables, 22 refs. **DWB, DLC**—Measurements of changes in length and weight of normal and rolled hair were carried out in a Bongards humidity calibration chamber at temperatures of 20°C with relative humidities ranging from 3–98%. Both the changes in length and weight curves show a hysteresis which is responsible for an error of the hair hygrometer during humidity changes. The rate of ascent of the curve of varying humidity is smaller than the rate of descent at relative humidities below 60% and is greater at relative humidities above 60%. The magnitude of deviation depends upon the initial desiccation and hence upon the initial humidity. Theoretical consideration and measurements indicate that only a small part of the moisture absorbed contributes to volume changes in the length axis; the greater part of the moisture is used on the horizontal volume change. At humidities above 80% a portion of the absorbed water is capillary water which does not produce changes in volume. Tables giving the absolute change in weight of water in normal and rolled hairs at 10% intervals of 20–96%, 60–97%, and 6–100% relative humidity and the % weight change of water in normal and rolled hair at 0–100% relative humidity are presented. *Subject Headings:* **1. Humidity calibration chambers 2. Hair hygrometers 3. Hygrometer calibration.**—*Author's summary and I.L.D.*

HYGROGRAPHS

10L–287 551.508.71

MacHattie, L. B., **Accuracy of the hair hygrograph.** *Canada. Meteorological Branch, CIR-3022*; TEC-265, March 10, **1958.** 9 p. 2 figs., 3 tables, 9 refs. **DLC, DWB**—Field checks show an average deviation per reading between hygrograph and psychrometer of ±4.5% RH; allowing for psychrometric error, an estimate of ±3.5% RH is obtained for the average error per hygrograph reading. Individual hygrograph errors were occasionally as large as 15% RH. The dependence of the hygrograph reading on previous as well as current humidity appears to be the chief cause of the larger errors. *Subject Headings:* **1. Hair hygrographs 2. Hygrograph errors.**—*Author's abstract.*

10L–288 551.508.71

Maksić, Branko, **Prilog teoriji higrografa.** [Theory of hygrographs.] *Jugoslavenska Akademija Znanosti u Umjetnosti, Zagreb. Odjela za Matematičke, Fizicke i Tehničke Nauke, Rasprave,*

1(6):157–197, **1955.** figs., tables, 11 refs., eqs. German summary p. 191–197. **DWB**—A detailed mathematical treatment is given of the contraction or expansion of hair as a function of moisture of the scales resulting from various types of mounting of the hair, and of the different accuracies. Particular attention is paid to the case of recording hygrometers with the hair held horizontally by its two ends and stretched in vertical direction at a point between the two points of suspension. *Subject Headings:* **1. Hair hygrographs 2. Hygrographs.**—*G.T.*

10L–289 551.508.71

Varzhenevskiĭ, N. S., **Plenochnye datchiki vlezhnosti.** [Pellicular moisture recorders.] *Leningrad. Nauchno-Issledovatel'skiĭ Institut Gidrometeorologicheskogo Priborostroeniia, Trudy*, No. 5:79–97, **1957.** 8 figs., 10 tables, 8 refs. **DLC, DWB**—Various studies appearing in the German and American meteorological literature on the properties of pellicular rolled hair and ordinary hair hygrometers are reviewed and the results of an extensive investigation on organic pellicular and hair conducted in the Soviet Union are presented. The contents of this paper include the following: an examination of the physical properties of organic pellicles and hair; mechanical properties of pellicles; calibration of hygrometers during positive and negative temperatures; inertia of hygrometers with pellicular moisture elements and of hair hygrometers; and field experiments with pellicle hygrometers. The relative elongation of the pellicle was on the average 3.5% while that of hair was about 2.0 2.5%. Pellicles operate at negative temperatures up to −60°–68°C, while ordinary hair functions only to −30–35°C and rolled hair up to −50°C–56°C. The coefficient of inertia of a pellicle is considerably less than that of hair both under negative and positive temperature. In case of positive temperatures and ventilation of 5 m/sec. The coefficient of inertia of a pellicle is 2–5 sec while that of rolled hair is 10–12 sec and that of ordinary hair 40–60 sec, since the inertia of a pellicle is independent of the direction of change during the interval of 20 100%. Pellicular elements are more precise than human hair both during positive and negative temperatures. Pellicular membranes are used most efficiently in the form of membranes stretched upon a metallic ring and having a firm center for junction with the mechanism of the instrument. Pellicular sensors have sufficient elastic forces in the selection of efficient working loads; when the diameter of the washer of the firm center is 8–10 mm the load upon the pellicle is between 10–20 gms and its variability should not exceed ±10%. *Subject Heading:* **1. Hair hygrometers.**—*I.L.D. and author's conclusions.*

Psychrometers

10L–290 551.508.71

Cole, Claude A. (*Weather Bureau Office, Pomona, Calif.*), **An improved method of making psychrometric observation at Fruit-Frost Stations in the field: a do-it-yourself project [in] how to build a power operated, hand-held psychrometer,** Oct. 16, **1957.** 3 p. 3 photos. Carbon of typescript. **DWB** (M08.71 U587im)—The sling psychrometer was introduced many years ago. Later, different fans were used to ventilate the mounted wet and dry bulb thermometers in it. Successful research work on further improvements has been completed by the Friez Instrument Division of the Bendix Corporation and has led to the development of the "Psychron" to be used in the future by the Fruit-Frost Forecasters. Until these new instruments are issued to Fruit-Frost Forecasters a very satisfactory imitation of the manufactured product can easily be made. A full description of how this instrument is constructed and used is given in this communication. *Subject Heading:* **1. Psychrometers.**—*N.N.*

10L–291 551.508.71

Passelecq, J. (*Faculté, Polytechnique de Mons, Belgium*), **Nouvelles mesures d'hygrometrie sous 0°C et comparaisons critiques.** [New hygrometric measurements below 0°C and critical comparisons.] *International Institute of Refrigeration, Bulletin*, Annexe 1956-2, p. 265–270, **1956.** 2 figs., 5 refs. **DLC**—The measurement of relative humidity below 0°C by Professor Glansdorff's method of the psychrometer with three thermometers demands a precise measurement of temperature, as was already shown by P. Jacobs. We demonstrate that it also demands a precise knowledge of the psychrometric constant. We determine experimentally this psychrometric constant. These measurements make clear the influence of the velocity and also of the shape of the thermometer bulbs. We thus can deduce the velocity zone where the psychrometric measurements are exact. By taking into account these new values for the psychrometric constant, it is found that the indications of the psychrometer with three thermometers agree very well with the values measured by means of Professor Lainé's dew point hygrometer, with a precision of ±2% down to temperatures of the order of −15°C. *Subject Headings:* **1. Low temperature hygrometry 2. Psychrometers 3. Hygrometers.**—*Author's abstract.*

10L–292 551.508.71

Shimizu, I., **Influence of ventilation velocity of psychrometer upon humidity.** *Journal of Meteorological Research*, Tokyo, 4(2):76–81, May **1952.** 12 figs. In Japanese; English summary p. 5. **DWB**—The influence of ventilation velocity of an Assmann type psychrometer upon humidity is investigated by using SPRUNG'S formula and YAMAMOTO'S experimental results. The relation between ventilation velocity and wet bulb temperature and that between ventilation velocity and relative humidity are calculated for some examples. The observed wet bulb temperature is compared with the calculated value. It is concluded that the small perturbation of ventilation velocity causes no error in the humidity value. *Subject Headings:* **1. Psychrometer ventilation 2. Humidity measurement techniques.**—*Author's abstract.*

Special Types

10L–293 551.508.71:551.507.352

Barr, William C. and Frazier, Quentin, **Axial-flow vortex hygrometer probe.** *Weather Radar Conference, Sept. 1955, Proceedings of the Fifth . . . Conference*, p. 235–242, pub. **1956.** 8 figs., 3 refs. **DWB**—Aircraft need to measure humidity while in flight. In this experiment the author illustrates the difference between humidity as recorded by two different types of probes, the stagnation and the vortex types. The stagnation type has a recovery factor of 0.87; the temperature and pressure in its probe increase to +8°C, and to 561 mb respectively. As a result, the element records the humidity of 17% R.H. The vortex probe type with a nose piece length of 0.430 in. drops its inside temperature about ½°C for a true air speed of 400 knots. The pressure inside the probe is 375 mb at an altitude of 20,000 ft. 44% is the relative humidity the element records. Different models of vortex probes are included, and reduced as well as deduced data are plotted out in this report. *Subject Headings:* **1. Vortex hygrometers 2. Air-borne hygrometers.**—*N.N.*

10L–294 551.508.71:551.507.352

Cook Research Laboratories, Skokie, Ill., **Improved infrared absorption hygrometer for aircraft observations of atmospheric moisture.** Contract AF 33(038)-23324, Interim Report PR 17–24, May 4, **1955.** 7 p. 3 refs. **DWB**—The U. S. W. B. infrared absorption hygrometer (Foskett, et al. 1953) [*MAB* 5.7-43] is adapted for use in aircraft for measuring extremely low dew point temperatures. Compression is used since tables do not exist for determining absorption coefficients of water vapor at such low pressures and temperatures as exist at high altitudes. The Perkin-Elmer instrument is too bulky even when simplified. With the improved Weather Bureau instrument a precision of at least 0.1 or 0.2°C in dew point is possible at stratosphere temperatures. It is suggested that this improved instrument be developed for automatic reconnaissance recording systems, since moisture is such an important factor in high speed high altitude flying. *Subject Headings:* **1. Infrared absorption hygrometers 2. Aircraft weather reconnaissance systems 3. Air-borne hygrometers. I. Foskett, L. W.**—*M.R.*

10L–295 551.508.71

Greinacher, H., **Diffusionshygrometer mit direkter Ablesung.** [A diffusion hygrometer with direct reading.] *Schweizer Archiv für Angewandte Wissenschaft und Technik*, Zurich, 20(6):198–200, June **1954.** Transl. into English, issued by Sandia Corporation, Albuquerque, N. M., available. **DWB** (M08.71 G824diE)—A description of a diffusion hygrometer is given, as well as a simplified method of handling the instrument's dichotomy. By a shifting device provided in the machine a direct reading of the relative humidity can be obtained, thus eliminating the reading of any manometer. It is also possible to adjust the instrument by means of an angular rotation instead of through lateral displacement. Instrument is manufactured by the Rueger firm, Lausanne, Switzerland. Diagrams provided. *Subject Heading:* **1. Diffusion hygrometers.**—*N.N.*

10L–296 551.508.71

Kolomets, N. V.; Starnzas, M. S.; Stil'bans, N. S. and Fateev, N. P., **The measurement of atmospheric humidity with semiconductor thermocouples.** [Transl. of original Russian in *Zhurnal Tekhnicheskoi Fiziki*, Moscow, 26(3):686–692, **1956.** Transl. (14 p. photostat of typescript, with 5 figs., 8 eqs.) issued by A.E.I. Research Laboratory as its *AEI T*/1046, Aug. **1956. DWB** (M08.71 K81mea)—The most promising method for measuring atmospheric humidity (be it in pure science or meteorology), throughout the range of temperatures and pressures, is the dew point. A few of the difficulties encountered in the use of this method have recently been surmounted by the use of a new automatic dew point hygrometer. The instrument is described in this report and its advantages over the other humidity measuring instruments are outlined. *Subject Heading:* **1. Dew point hygrometers.**—*N.N.*

10L–297 551.508.77

Shcherbakova, L. F., **Diffuzionnyĭ gigrometr.** [Diffusion hygrometer.] *Meteorologiia Gidrologiia*, Leningrad, No. 6:49–52, June **1957.** 2 figs., 8 refs., 4 eqs. **DWB**—The principle of th diffusion hygrometer, the history of its development since 1877 and descriptions of contemporary models of this instrument are presented. A description of a new type of diffusion hygrometer based upon the principle of the first apparatus developed by GREINACHER on which two chambers, a drier and a humidifier, are employed. The direct measurement of very low relative humidities can be carried out. A photograph of hygrometer with manometer and aspirator is reproduced. *Subject Heading:* **1. Diffusion hygrometers.**—*I.L.D.*

10L–298 551.508.71

Wildhack, W. A., **Hygrometer, Type 26-301, Moisture Monitor [manufactured by the Consolidated Electrodynamics Corporation, 300 North Sierra Madre Villa, Pasadena, California]** *Review of Scientific Instruments*, N. Y., 28(1):63–64, Jan. **1957.** photo. **DLC, DGL**—Based on principle developed by E. I. du Pont de Nemours and Co.; operates on 50/60 cy, 105–125 v ac Measures water content to 1% and permits meter readings of 0 to 1000%. Output can be telemetered to a remote recorder. An electrolysis cell continuously absorbs and electrolyzes all water present. The current is directly related to mass-rate-of-flow of water into instrument. Rate of flow of air into analyzer is kept constant at 100 cc/min. *Subject Headings:* **1. Electrolytic hygrometers 2. Remote recording hygrometers.**—*M.R.*

EVAPORIMETERS (551.508.72)

10L–299 551.508.72

Liestøl, Olav, **A new type of ablatograph.** *Journal of Glaciology*, 2(16):431–432, Oct. **1954.** 2 figs., 2 refs. **DWB**—The instrument consists of four floats, painted white, attached to a string which actuates the pen on a drum on a wooden beam. This is supported on aluminium tubes driven at least 2 m into the ice. *Subject Heading:* **1. Ablation instruments.**—*C.E.P.B.*

10L–300 551.508.72

Prodanov, D. T., **Podobrani plavashti izpariteli.** [Improved floating evaporimeters.] *Khidrologiia i Meteorologiia*, Sofia, No. 1:68, **1956. DLC**—Improvements on the float of the water surface evaporimeter prevent intrusion of water into the pan during wave activity. *Subject Heading:* **1. Floating evaporimeters.**—*G.T.*

DEW POINT RECORDERS AND DROSOMETERS (551.508.74)

10L–301 551.508.74

Passelecq, J. (*Faculté, Polytechnique de Mons, Belgium*), **Un appareil simple pour déterminer le point de givre dans les salles refroidies par un faisceau de tubes.** [Simple equipment for measuring dew point in a room refrigerated by cooling coils.] *International Institute of Refrigeration, Bulletin*, Annexe 1956-2, p. 261–263, **1956.** fig. English summary p. 261. **DLC**—Instead of slowly cooling a mirror and of measuring its temperature at the moment a dew layer is appearing, it is easier to cool the extremity of a rod, placed in the air to be measured, to a temperature below the dew point, to wait for the formation of dew on this rod, and to measure the temperature at the spot where the dew layer is beginning. In a room cooled by a bundle of tubes, it is found that the superficial temperature of these tubes is always lower than the dew point of air of this room. These tubes may be used as a cooling source for the rod. The apparatus, that will be described, is based on these two properties. Some air of the room is blown, by means of a small blower, on a glass tube surrounding a polished copper rod, soldered to one of the cooling tubes. Thus the rod ices up over a certain portion of the rod. It is sufficient to measure the distance at which white frost stops and also to determine the variation of temperature along the rod (by means of some thermocouples) in order to obtain the dew point of the air in the room. *Subject Headings:* **1. Dew point measurement techniques 2. Dew point recorders.**—*Author's abstract.*

10L–302 551.508.74

Davis, P. A. (*Geophysics Research Directorate*), **Dew deposit.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:123–125. table, 3 refs.) **DWB**—A description of the construction and operation of the Taylor dew meter and the Duvdevani dew gage both of which were used in the O'Neill experiments is presented. And a table containing a summary of results from the Taylor dew meter for a given period is included. *Subject Headings:* **1. Drosometers 2. Duvdevani dew gage 3. Taylor dew meter 4. Dew observations 5. O'Neill, Nebr.**—*I.L.D.*

10L–303 551.508.74

Masson, H., **Les différents types de drosométres.** [The different drosometer types.] *La Météorologie*, Paris, Ser. 4, No. 48:503–513, Oct./Dec. **1957.** 5 figs., 2 graphs, 1 table, 12 refs. French, English and Spanish summaries p. 503. **DWB**—After briefly recalling already existing apparatus, the author describes a new type of instrument for measuring concealed condensation occurring on the ground. Examples of recordings are attached to this survey. *Subject Heading:* **1. Drosometers.**—*Author's abstract.*

INSTRUMENTS FOR MEASURING CLOUD CHARACTERISTICS (551.508.76)

10L–304 551.508.76

Goĭsa, N. I., **Uglomer dlia opredeleniia okolosolnechnoi i okolozenitnoĭ chasteĭ nebosvoda.** [Goniometer for determining the circumsolar and circumzenith portions of the celestial arch.] *Meteorologiia i Gidrologiia*, No. 10:57, Oct. **1956.** fig. **DWB, DLC.** Transl. into English available for reference. **DWB** (M08.99 G724go)—A description of the construction and use of a simple device for determining easily the presence and amount of cloudiness in those portions of the sky near the sun (included within a radius of 5° around the sun) and near the zenith (within a radius of 15° around the zenith). It consists of a truncated cone made out of tin with a handle. The angle at the apex of the cone is 15°. At the base of the cone on crossed wires are attached two supplementary rings. *Subject Headings:* **1. Goniometers 2. Cloudiness measurement instruments.**—*I.L.D.*

10L–305 551.508.76

MacCready, Paul B., Jr., **The Munitalp cloud theodolite.** Dec. 30, **1955.** 8 p. 7 figs.—An inexpensive cloud theodolite has been developed to help an observer find cloud positions and movements. For velocity and direction measurements the observer notes the time and direction the cloud moves across a pattern which is optically superimposed on the sky. Charts are provided which simplify the task of finding cloud speeds (if height is known), directions, and positions from the measurements. The cloud theodolite is discussed in its relation to various methods of measuring clouds and cloud characteristics from the ground. *Subject Headings:* **1. Theodolites 2. Wind measurement techniques 3. Munitalp cloud theodolite.**—*Author's abstract.*

CLOUD BASE AND TOP INDICATORS (551.508.762)

10L–306 551.508.762

Banerjee, A. K. (*Met. Office, Sonegaon Airfield, Nagpur*), **Measurement of height of cloud base.** *Science and Culture*, Calcutta, 22(2):110–111, Aug. **1956.** 5 eqs. **DLC**—A rotating searchlight for measuring heights of cloud bases, especially when scattered clouds are found over an airport, is superior to a fixed beam or a ceiling balloon, as either of the latter two may not hit the clouds. The trigonometry of the calculations from the rotating beam is given in detail. An added advantage is the ability to fix the exact position (direction and distance) of a patch of low clouds, as well as its height. *Subject Headings:* **1. Rotating beam ceilometers 2. Cloud height measurements.**—*M.R.*

10L–307 551.508.762

Bershchanskiĭ, Iu. I., **O modernizatsii potolochnogo prozhektora PI-45-1.** [Modernization of the ceiling searchlights PI-45-1.] *Meteorologiia i Gidrologiia*, Leningrad, No. 10:35–36, Oct. **1957.** fig. **DWB, DLC.** Translation available. **DWB** (M08.762 B535mo)—The various defects of the PI-45 ceiling searchlight in use are itemized and a new model containing various improvements is described by means of a diagram. The searchlight was put on a 220/100 v current and provided with a 1000 w lamp. Housed elements such as the rheostat, transformers, etc. were eliminated. Ventilation openings were provided. The focusing of the lamp was improved so that a distinct light spot was thrown upon the lower margin of a cloud. The use of this ceiling searchlight particularly in the case of St and Ns clouds, is discussed. *Subject Heading:* **1. Ceiling projectors.**—*I.L.D.*

10L–308 551.508.762

Bureau, Robert and Jardy, Henri, **Altimétrie des nuages.** [Altimetry of clouds.] *Académie des Sciences, Paris, Comptes Rendus*, 241(3):325–327, July 18, **1955.** 3 figs., ref. **DWB**—The first cloud height records obtained with light impulses observed on an oscilloscope were obtained at Bagneux in 1939 but results were not published until 1946 (Bureau, R. in *La Météorologie*, No. 3, July/Sept. **1946** and Barthélémy, R. in *Acad. des Sci., Paris, Comptes Rendus*, 222:450, **1946**). The present method allows integration of the cloud heights for 3 sec (rather than single measurements at 4μ sec) and records reproduced give a smooth visual trace of cloud base (or top) height for 5 min, showing in a scale of 0–2 or 0–5 km the elevation or changes in elevation of the clouds. The examples

show stratus at 300 m, and cumulus altimetry from 1200–2000 m, respectively. *Subject Headin* **1. Cloud height oscilloscopes 2. Ceilometers.**—*M.R.*

10L–309 551.508.7

Lang, Walter and Roth, Lothar, **Anlage zum Messen der Wolkenhohe am Tage.** [Apparat for daytime measurement of cloud height.] *Siemens Zeitschrift*, Berlin, 31(7):367–373, July 19 12 figs., eqs. **DLC**—Cloud height can easily be measured at night by triangulation of a poi illuminated with a searchlight. An application of this method to daytime measurement of clo height is described in this paper. A modulated light signal (distinguishable from daylight by photoelectric cell but not by visual observation) is sent out by a searchlight moving in a verti plane. Cloud height is determined from the angle of the searchlight at the moment when the sig reflected from a cloud is received by the photoelectric cell which is aimed upwards. The searchlig angle is transmitted electronically to an indicator dial and recording apparatus where it gives dir cloud height readings. The equipment is shown in photographs and diagrams. *Subject Headir* **1. Cloud height measurement.**—*G.T.*

10L–310 551.508.7

Morasca, Nicola, **L'impiego del lampo elettronico nei nefoipsometri a proiettore luminoso.** [U of the electronic flash in searchlight type nephohypsometers.] *Rivista di Meteorologia Aeronautic* Rome, 17(1):50–52, Jan./March **1957.** eqs. Italian, French, English and German summari p. 50. **DLC**—In view of increasing the efficiency of the nephohypsometer, while reducing the pow required and the installation cost, use of the electronic flash, as a source of light is suggested. A attempt is made to determine what increase in perceptible luminous intensity could be obtain from this source, which might probably, in appropriate conditions, permit making use of the neph hypsometer even during daytime. *Subject Headings:* **1. Nephohypsometers 2. Ceilometers.** *Author's abstract.*

CLOUD WATER CONTENT AND DROP SIZE METERS (551.508.765)

Cloud Water Content And Drop Size Meters

10L–311 551.508.765:551.501

Aldaz-Isanta, L. and Keily, D. P., **An airborne cloud drop impactor.** Mass. Institute Technology. Dept. of Meteorology. Instrument Laboratory, Contract AF 19(604)-1287, Scientifi Report No. 3, June 15, **1957.** 22 p. 5 figs., 9 tables, eqs. **DWB**—An air-borne cloud drop catch of the impact type supplied by the sponsoring agency has been modified to improve its collectic efficiency in the size range 1–10μ diameter. Computations indicate that the new design shou provide collection efficiency exceeding 75% at 4μ and above but with sharply reduced efficienc below that size. *Subject Headings:* **1. Air-borne cloud drop samplers 2. Cloud droplet samplin** —*Authors' abstract.*

10L–312 551.508.76

Barrett, Earl W., **A comparative flight test of three instruments for measuring cloud wat content.** Chicago. Univ. Dept. of Meteorology, Cloud Physics Lab. Technical Note No. 14, Fina Report under grant (N.S.F.) G-2164, May 31, **1958.** 17 p. 3 figs., 3 refs.—Some data obtain during cloud penetrations with the chemical conductometric device and capillary collector prob the paper tape conductometric probe and the heated wire probe are presented and discussed in th report. Operational characteristics of the three devices are described, with emphasis on the chemic conductometric instrument. *Subject Heading:* **1. Cloud water content meters.**—*Author's abstract.*

10L–313 551.508.76

Burtin, R., **Présentation d'un nébulogranulomètre.** [Presentation of a nebulogranulometer. *Revue d'Optique*, Paris, 37(8):391–396, Aug. **1958.** 4 figs. **DLC**—A "nebulogranulometer" described that gives statistical information on water droplets in haze and fog when they have radius greater than 2μ. The following method is used: the droplets are drawn in and blown throug a small chamber illuminated on both sides and they are photographed at right angles to the illumina ing beam. Every droplet leaves on the plate four traces at intervals proportional to its diamet A suitable design allows their velocities and hence their number per unit volume to be measure *Subject Headings:* **1. Nebulogranulometers 2. Drop size meters.**—*Author's abstract.*

10L–314 551.508.765:551.576.1:551.575

Fea, Giorgio, **Dispositive per la misura e la registrazione continua del continuto di acqua liqui di una nebbia o di una nube.** [Apparatus for the measurement and the continuous registrati

f the liquid water content of a cloud or of fog.] *Rivista di Meteorologia Aeronautica*, Rome, 14(3/4): –9, July/Dec. **1954.** 5 figs., table, eqs. Italian, French, English and German summaries p. 9. **Comment** by N. Morasca in *Ibid.*, 15(2):38, April/June **1955.**—The theory of an instrument based n latent evaporation heat, for determining the liquid content of fog or a cloud is presented. The elation shows that the difference T_2-T_1 between two thermometers placed before and after a eater-evaporator where air is allowed to circulate, is given by an instrumental constant A, minus ne term being proportional to the liquid content x, and approximately equal to 2.5 x; so that we et $x=A-(T_2-T_1)/2.5$ with fair approximation. Thereafter, A having been determined by easuring T_2-T_1 in dropless air, the record obtained, for instance by means of thermocouples of T_2-T_1, should permit knowledge of the behavior of x. MORASCA in his note suggests a simplification f Fea's apparatus. *Subject Headings:* **1. Water content of clouds 2. Water content of fog 3. Liquid water content meters.**—*Author's abstract and M.R.*

10L–315 551.508.765:551.576.1:535.4

Feĭgel'son, E. M., **Opredelenie vodnosti oblakov po ikh rasseivaiushcheĭ sposobnosti.** [Determination of water content of clouds by their scattering ability.] *Akademiia Nauk SSSR, Geofizicheskii Institut, Trudy*, No. 23(150):92–105, **1954.** 2 figs., 3 refs., 31 eqs. **DLC.** Transl. available. **DWB** (M08.765 F433ca)—An attempt is made to determine the water content of a cloud from its scattering ability, since the latter is a function of the water content and size of water drops, by determining the attenuation of radiant energy in a cloud layer of given thickness. It is assumed light reaching a receiver 10–20 m from a horizontal searchlight is attenuated only by scattering of water droplets. Theoretical equations are developed for determining water content. *Subject Headings:* **1. Water content of clouds 2. Scattering of light.**—*I.L.D.*

10L–316 551.508.765:551.507.352

†Hacker, Paul T., **An oil-stream photomicrographic aeroscope for obtaining cloud liquid water content and droplet size distributions in flight.** *U. S. National Advisory Committee for Aeronautics, Technical Note*, 3592, Jan. **1956.** 36 p. 10 figs. (incl. photos), 2 tables, 26 refs., 8 eqs. **DWB, DLC**—An air-borne cloud aeroscope by which droplet size, size distribution, and liquid water content of icing and nonicing clouds can be determined has been developed and tested in flight and in wind tunnels with water sprays. The cloud droplets are continuously captured in a stream of oil, which is then photographed. In most cases, droplet size distribution can be obtained from a single photograph. With the droplet size distribution known, the liquid water content of the cloud can be calculated from the geometry of the aeroscope, the airspeed, and the oil flow rate. The aeroscope is described in detail, and some droplet size distribution and liquid water content values obtained during tests are presented. *Subject Headings:* **1. Cloud droplet size distribution instruments 2. Air-borne cloud aeroscopes 3. Cloud droplet size measurement instruments 4. Water content of clouds measurement instruments.**—*NACA abstract.*

10L–317 551.508.765:551.578.11

Mass. Institute of Technology, Dept. of Meteorology, **Measurement of drop size distribution and liquid water content in natural clouds.** Contract AF 19(604)-1287, Final Report, Dec. 31, **1957.** 10 p. 6 figs. (incl. photos), 3 tables. **DWB**—An air-borne probe type instrument for counting and sizing cloud drops has been extensively redesigned and field tested on a mountain top and in aircraft. It has proved capable of counting water droplets in the size range of approximately 1–60μ diameter. An air-borne impact type cloud drop catcher supplied by the sponsor has been modified and field tested. With it, droplets in the size range 3–60μ have been observed. *Subject Headings:* **1. Drop size distribution instruments 2. Liquid water content meters.**—*Author's abstract.*

10L–318 551.508.765

Millen, S. G. and Keily, D. P., **Modifications of the electric probe drop counter for airborne use.** Mass. Institute of Technology. Dept. of Meteorology. Instrument Laboratory, Contract AF 19(604)-1287, Scientific Report No. 5, Aug. 15, **1957.** 8 p. 30 figs. (incl. photos), table, 11 refs. **DWB**—This report describes modifications to an electric probe, a cloud camera and associated natural cloud drop counting and sizing equipment made between surface field tests on Mount Washington in 1955 and flight tests in 1957. *Subject Heading:* **1. Air-borne cloud drop sampler.**—*Authors' abstract.*

10L–319 551.508.765

Owens, George V., **A pneumatically operated cloud droplet sampler.** Chicago. Univ. Dept. of Meteorology, Cloud Physics Laboratory, Contract Cwb-9021, Technical Note No. 7, June 1, **1957.** 15 p. 4 figs. (incl. photos), 7 refs., 3 eqs. **DWB**—The development and construction of a four slide, pneumatically operated cloud droplet sampler, using the movable, oiled slide technique, are

described. An analysis is given of the operation of this instrument system with particular referenc to the aerodynamic forces involved and the wind tunnel experiments necessary to determine these A summary of these forces is made with a description of the methods used to compensate for the effect on the operation of the instrument. *Subject Heading:* **1. Cloud droplet samplers.**—*Author abstract.*

10L–320 551.508.76

Rayner, A. C. and Haliburton, Wm. (*both, Dept. of Agriculture, Ottawa, Canada*), **Rotary devic for producing a stream of uniform drops.** *Review of Scientific Instruments*, N. Y., 26(12):1124–112 Dec. **1955.** 4 figs., table, 15 refs. **DWB, DLC**—A rotary device was developed to produce uniform drops of liquids in the diameter range of 50–700μ. A horizontally rotating blade detaches drop in a steady stream of regular trajectory, from a stabilized liquid mass fed under constant hea through a stationary capillary. Its operation is described, and performance characteristics wit oil and aqueous test solutions are given. Drop size is calculated from the mass of drops emitte in a given interval at a known generation frequency. Variation in size of individual drops, electro static effects, and some uses for the machine are noted. *Subject Heading:* **1. Drop size meters.**— *Authors' abstract.*

10L–321 551.508.765:551.578.1

Stout, Glenn E., **Study as to merits of various rapid raindrop counting and sorting techniques** Illinois. State Water Survey. Meteorologic Lab. at the Univ. of Illinois, Contract AF 19(604) 1900, Final Report, May 15, 1956–March 31, **1958.** 28 p. 3 figs., 2 refs.—An evaluation is mad of the known instruments, designs, and methods of counting rain and drizzle drops according t their sizes. Devices and techniques used to sense the sizes are listed in the report and are discusse in Scientific Report No. 1. In the Appendix, the following are discussed: the illumination of highly reflective and transparent spheres as an aid to automatized counting; the use of a cylindrical len for drop photography; and the raindrop and cloud droplet sizing and counting techniques for use in aircraft. *Subject Headings:* **1. Drop size measurement techniques 2. Raindrop counting.**—*N.N.*

Fog Meters

10L–322 551.508.765

Fukutomi, Takahara and Sugawa, Akira, **A device of a portable fog meter of heat generating type by the use of sulphuric acid and rod- and string-shaped fog collectors.** (In: Sapporo, Japan Hokkaido University. Institute of Low Temperature Science, **Studies of fogs in relation to fog preventing forest. 1953.** p. 221–238. 5 figs., 3 tables, 2 refs.) Also in: *Low Temperature Science Sapporo, Japan, Ser. A, Physical Science*, **11**:7–18, **1953.** 5 figs., 3 tables, 2 refs., 25 eqs. In Japanese. English summary p. 18. **DWB**—The structure and principle of the fog meter are described with the aid of diagrams, photographs and mathematical formulas. The instrumen consists of two fog collectors with different efficiencies. The principal parts of one are a thin roo shaped alcohol thermometer, and a small Dewar flask; those of the other are two fine platinum string stretched parallel to each other, a Dewar flask and a thin thermometer. The thermometer in the first unit and the wires are the capturing agents of fog particles. The fog meter contents are meas ured indirectly by noting the rise in temperature resulting from the heat generated when sulfuric acid is mixed with water. Results of measurements carried out by means of this instrument are given. *Subject Heading:* **1. Fog meters.**—*I.L.D.*

10L–323 551.508.765

Tabata, Tadashi; Huzioka, Tosio and Matsumura, Nobuo, **A relay system of automatic fog meter.** *Low Temperature Science, Sapporo, Japan, Ser. A, Physical Sciences*, 11:63–65, **1953.** fig In Japanese; English summary p. 65. **DWB**—The automatic fog meter is composed of four elements fog capturing element, element for counting the droplets which drop from the fog capturing element Robinson's sun anemometer and Richard's totalizing chronograph. Counting of the number of droplets is achieved by means of the electron tube systems whose circuit diagrams are shown. Every time a droplet starts to fall from a metal tube attached to the base of the fog capturing element, it connects the grid of an electron tube to the earth, the plate current increased thereby acting on the chronograph. *Subject Headings:* **1. Fog meters 2. Fog droplet counters.**—*Authors' abstract.*

10L–324 551.508.765:551.57

Tabata, Tadashi; Huzioka, Tosio and Matsumura, Nobuo, **Studies on recording fog meters [Pt. 1].** *Low Temperature Science, Sapporo, Japan, Ser. A, Physical Sciences*, 12:121–142, **1954** 15 figs., 4 photos, 2 plates, 10 refs. In Japanese; English summary p. 138–139. Tabata, Tadash and Suzuki, Yosio, **Studies on recording fog meters, Pt. 2.** *Ibid.*, 14:117–123, **1955.** 8 figs., table

s. In Japanese; English summary p. 123. **DWB, DLC**—The authors describe the construction d operation of fog meters for observing fog water content in unit volume of foggy air. These ters are composed of four elements: a fog capturing element consisting of a vertical wire recess tched between the rim of a circular disc and that of the cone; an element for counting the droplets ling from the fog capturing unit that consists of a mechanical relay and electron tube switching cuits; Robinson's cup anemometer; and a recording element. A formula expressing the amount fog captured in a given time is presented. The magnitude of droplets was almost 40 mg in weight. order to get large droplets, a syphon type tube was used with success in obtaining droplets of iform weight of about 102 mg. *Subject Headings:* **1. Fog meters 2. Fog droplet counters.**—*I.L.D.*

ICING METERS (551.508.768)

10L–325 551.508.768

Minervin, V. E., **Ob izmereniiakh vodnosti i obledeneniia v pereokhlazhdennykh oblakakh i o kotorykh oshibkakh etikh izmerenenii.** [The measurement of water content and icing in super- oled clouds and some errors of these measurements.] *Moscow. Tsentral'naia Aerologicheskaia servatoriia, Trudy*, No. 17:15–35, **1956.** 11 refs., 6 figs., 4 tables, 38 eqs. **DLC**—In both types apparatus developed in the U.S.S.R. for measuring the water content of clouds, supercooled drops eze when they settle on the surface of a cylinder or paper and the receiving surface freezes. When e drops freeze the heat of fusion of ice is released so that the temperature of the ice formed is ised in comparison to the temperature of the ambient air. This study investigates the precision measurements of water capacity at negative temperatures near 0°. The theory of this problem is esented together with formulas for measuring the water capacity of clouds close to the freezing mperature. The experimental verification of these formulas is presented. Data are presented on e value of water capacity of clouds as measured by the apparatus of V. A. Zaitzev and the SIV-1 paratus. *Subject Headings:* **1. Cloud water content meters 2. Icing meters 3. Freezing of cloud oplets 4. Supercooled water drops.**—*I.L.D.*

10L–326 551.508.768:551.574.7

Neel, Carr B. (*Ames Aeronautical Lab., Moffett Field, Calif.*), **A heated-wire liquid-water-content strument and results of initial flight tests in icing conditions.** *U. S. National Advisory Committee r Aeronautics, Research Memorandum*, RM A54123, Jan. 20, **1955.** 33 p. 13 figs. (incl. photos), ble, 11 refs. **DWB**—In the conduct of research directed toward the development of a simple strument suitable for the measurement of icing severity, a flight version of the NACA heated wire quid water content instrument was constructed and flight tested in natural icing conditions. Data btained simultaneously with rotating multicylinders indicated that reliable flight measurements of quid water content could be made with the heated wire instrument. The rate of response of the strument to variations in water content was sufficiently high to enable a detailed study of cloud ructure. Tests in a cloud duct during development of the instrument indicated that measurements uld be performed at speeds up to at least 700 mph. Although the flight tests revealed certain fficiencies in the present form of the instrument, it appeared that, with the inclusion of several odifications, the heated wire device could serve as a useful and practical flight instrument. Results the flight measurements in natural icing conditions substantiated the high values of liquid water ntent predicted in a previous statistical analysis. The highest value measured was 3.7 g/m³. *ubject Headings:* **1. Cloud water content meters 2. Icing meters.**—*Author's abstract.*

10L–327 551.508.768

Skala, Jiři, **Přístroj na samočinné a nepřetržité zaznamenávání námrazy (geligraf).** [An strument for automatic continuous recording of icing.] *Meteorologicke, Zpravy*, Prague, 10(5):135, **957.** fig. **DWB**—An icing meter developed by M. Končeк and patented under the Czechoslovak atent number 84,636 is described. Icing which takes place on an exposed cylinder is measured in rms of weight increase by an attached scale. Positions of the scale are recorded continuously so hat the rate of icing is obtained at all times. A detailed diagram of the apparatus is presented. *ubject Heading:* **1. Icing meters.**—*G.T.*

RAIN GAGES, PLUVIOGRAPHS, SNOW GAGES, ETC: (551.508.77)

Rain Gages

10L–328 551.508.77:551.501.777

Birkett, John, **Surface tension and the readings of raingages.** *Weather*, London, 7(12):371–372, ec. **1952.**—Experiments showed that drops adhering to sides of a gage funnel represent a loss of up to 01 in. *Subject Headings:* **1. Rainfall measurement 2. Rain gages.**—*C.E.P.B.*

10L–329 551.508.77:551.57

Hoeck, E., **Sur les mesures pluviométriques dans le bassin de la Baye de Montreux.** [Pluv metric measurements in the catchment area of Bay of Montreux.] *International Union of Geod and Geophysics, Association of Scientific Hydrology, Oslo, 1948* [*Transactions*], 1:180–190, [n.d 6 figs., 3 tables. **DWB**—Systematic errors in the water balance measurements of catchment ar with steep slopes are introduced, if precipitation gages have horizontal openings. A comprehens experiment under natural conditions was made with tilted gages and totalizers which caught 6–11 more precipitation than standard rain gages. Data cover the months June 1946–Sept. 1947. *Subj Headings:* **1. Rain gages 2. Rainfall measurements 3. Catchment basins 4. Montreux Bay.**—*A.*

10L–330 551.508

Krečmer, Vladimír and Fojt, Vojtěch (*both, Zbraslav-Strnady*), **Srážkoměr pro mikroklima logické a ekologické studie.** [Rain gage for microclimatological and ecological studies.] *M teorologické Zprávy*, Prague, 11(6):156–159, **1958.** 6 figs. Russian and German summaries p. 1 **DWB, DLC**—Two small rain gages, the Jarda type and one developed by the author, are descrit and illustrated, and comparative measurements with conventional rain gages reported. The Jar type gage is found to lack sufficient accuracy, but the author's instrument gave results showing average deviation of only 0.09 mm as compared to the conventional gage. Its compactness ma this instrument suitable for micrometeorological and ecological measurements; the low cost wou enable the use of large numbers of gages in field studies. The gage is not to be used for more me urements, however. *Subject Headings:* **1. Rain gages 2. Micrometeorological instruments.**—*G.*

10L–331 551.508.

Learmonth, J. R. (*Civil Engr., New South Wales, Univ. of Technology*), **Areal coverage of p viometers.** *Institution of Engineers of Australia, Sydney, Journal*, 26(10/11):224–225, Oct./N **1954.** (Summary only.) **DLC**—A study was made of 4 storms in the Sydney-Blue Mountai area of New South Wales, using 8 rain gage records (4 in city area), to see what error would involved in using any one record as an estimate of the rainfall at any other of the 8 gages, and relati the error to distance and altitude. It is concluded that the mountain station records could be us interchangeably for determining amounts of excess rainfall and temporal patterns. In some cas stations 110 mi apart showed similar patterns; in others a distance of 10 mi would result in serio error. Coastal records used for estimating mountain rainfall gave too high results, because greater variability in lowlands and vice versa. *Subject Headings:* **1. Areal representativeness of ra gages 2. Sydney, New South Wales.**—*M.R.*

10L–332 551.508.

*Mani, Anna (*Met. Office, Poona*), **Difference between rainfall catches recorded in shallow a deep rim raingauges.** *Indian Journal of Meteorology and Geophysics*, Delhi, 8(4):427–434, Oct. 19 fig., 6 tables, 4 refs. **DWB, DLC**—Comparisons of deep rim with standard (shallow rim) rain gag at Poona (1929–30), Alipore (1935–37), Colaba (1940–41), Jubbulpore (1940–41) and recent (1948–50) at Poona and Mahabaleshwar showed that increases in catch in the deep rim gages 0.2%–3% were not significant as in most cases no difference was noted. In many cases the de rim caught less than the shallow, and only in very heavy rains was splashing effective in lowerin catch of shallow gages. Differences in wind speed and in exposure altered effects as much as ty of rim. Results are given in extensive tables. *Subject Headings:* **1. Rain gage rim compariso 2. Rainfall measurements 3. India.**—*M.R.*

10L–333 551.508.

Nothmann, E., (*Israel Met. Service, Hakirya, Tel-Aviv*), **A recording raingauge.** *Journal Scientific Instruments*, 29(7):229–230, July **1952.** fig., 2 refs. **DWB**—The rain gage, designed avoid principal errors of conventional rain recorders, consists of two independent systems, one t float chamber for automatic emptying, the other a self balancing weighing beam for recording rainfa High accuracy, compared with ordinary rain recorders, was achieved. Patented by an Israeli firn *Subject Heading:* **1. Rain gages.**—*A.A.*

10L–334 551.508.

Pasteur, Félix Edmond (*France*), **Pluviomètres aerodynamiques orientables.** [Direction aerodynamic rain gages.] *International Union of Geodesy and Geophysics, Association of Scienti Hydrology, Toronto, Sept. 3–14, 1957*, [*Transactions*], 1:495–498, pub. **1958.** 3 figs. **DWB**—T difficulties involved in measuring rainfall often result from the angle of the rainfall due to wind actio Two model aerodynamic rain gages were constructed. Tables show the amounts of rain collect during the period Aug. 7–25, 1954, by the two aerodynamic rain gages in comparison with the amou collected by a conventional rain gage. *Subject Headings:* **1. Aerodynamic rain gages 2. Wind effe on rain gage accuracy.**—*N.N.*

10L–335 551.508.77

Poncelet, Lucien (*Chief, Climat. Ser., Royal Met. Inst. of Belgium*), **La nouvelle installation pluviométrique de l'Institut Royal Météorologique de Belgique.** [The new pluviometric installation of the Belgian Royal Meteorological Institute.] *International Union of Geodesy and Geophysics, Association of Scientific Hydrology, Brussels, 1951,* [*Transactions*], 3:52–58. diagr., table. Abstracted from reprint. **DWB**—Short description of new pluviometric installation introduced in 1951 in the Belgian network after a rapid replacement of the older type. The receptacle for the rain gage approaches a spherical form with a conic bottom for better downflow. A special nivometer was adopted. Nipher cone constructed according to the suggestions of C. F. Brooks (1938). Comparative data for different rain gages and heights above ground (only 28 hrs of rain) show slight differences. *Subject Headings:* **1. Rain gages 2. Nivometers 3. Belgium.**—*A.A.*

10L–336 551.508.77

*Poncelet, Lucien, **Comparaison de pluviomètres.** [Rain gage comparisons.] *International Union of Geodesy and Geophysics, Association of Scientific Hydrology, Rome, 1954,* [*Transactions*], 295–308. 5 figs., 4 tables. **DWB, DLC**—A number of different types of rain gages were compared in a uniform exposure at Uccle, during 1952–54, to determine the variations between them and to analyze the effects of wind turbulence, evaporation and splashing, and the advantages of the Nipher shield, etc. It was found that variations up to 5 or 6% were possible in the same area, and that this does not allow for effects of topography, shelter or observation at sea. A "standard" rain gage would be selected from a careful comparison of several "standards." Details of installations, types of gages tested, monthly totals for each of 11 gages for the 27 months and the percentage variations for each (range from 93.5–103.1% of standard, or if snow and amounts <0.2 mm are omitted, from 97.6–101.8%). The effects of wind (which are about as great as the general variation between gages), and effect of rate of rainfall are analyzed and presented. *Subject Headings:* **1. Rain gage comparisons 2. Wind effects on rain gages.**—*M.R.*

10L–337 551.508.77

Ponomarev, V. I., **Nekotorye uluchsheniia raboty pliuviografov sistemy Gel'mana.** [Improving the Hellmann type pluviograph.] *Meteorologiia i Gidrologiia,* Leningrad, No. 5:54–56, May **1957.** fig. **DWB**—The various defects in the operation of the Hellmann pluviograph arising both from inadequacies in the siphon and in the recording device are discussed. The author proposes a method for accelerating the rise in the level of the precipitation in the float chamber at the moment the siphon so that the filling of the curved part of the siphon tube with water is hastened. Also means of reducing friction of the pen or ribbon and sealing hermetically the attachment of the siphon are suggested. *Subject Headings:* **1. Hellmann rain gage 2. Siphon rain gages.**—*I.L.D.*

10L–338 551.508.77

Sanuki, M. and Tsuda, N. (*Meteorological Research Institute, Tokyo*), **Experiments on the amount of splash from the wind shield of a rain gauge.** *Papers in Meteorology and Geophysics,* 4(1):35–42, April **1953.** 7 figs., table, 3 refs.—The measurement of splash amount from the rain gage windshield is carried out for three droplet diameters of 6.2 m. The splash is found to be of the order never negligible in actual rainfall observations. Prevention by means of wire gage spread over the windshield is investigated and only the gage mesh width less than 1 mm is found effective. The influence of wind is also tested, which can be avoided by the 1 mm mesh wire gage. *Subject Heading:* **1. Rain gage windshields.**—*Authors' abstract.*

10L–339 551.508.77

Victor Rain-gage Co., **Rain gage.** *Instruments,* Pittsburgh, 23(1):52, Jan. **1950.** illus. **DLC**—Brief notice of new plastic tube rain gage measuring up to 6 in. rain, with all parts proof against rust and corrosion. A photograph showing the instrument is included. *Subject Heading:* **1. Rain gages.**—*G.T.*

10L–340 551.508.77

Warnick, C. C. (*Univ. of Idaho, Moscow, Idaho*), **Experiments with windshields for precipitation gages.** Discussion by Walter T. Wilson. *American Geophysical Union, Transactions,* 34(3):379–388, June **1953.** 12 figs., 5 tables, 2 refs.—One of the first series of laboratory experiments under controlled conditions, performed mostly with sawdust in a low speed wind tunnel, using model rain gages. Additional field studies were made in mountain locations under extreme exposure conditions. One of the difficulties involved was the formation of rime between the gage and the shield. The efficiency in catch was computed for 9 combinations of gages and shields. Only a few gave satisfactory results. The best seems to be an Alter windshield, modified by the author (large diameter of the supporting ring, more and larger bottles, annular spacers instead of the restraining chain). *Subject Headings:* **1. Rain gages 2. Rain gage shields 3. Alter shield. I. Wilson, Walter T.**—*A.A.*

10L–341 551.508

Yajima, Y., **On the diameter of rain-gauge receiver.** *Meteorological Society of Japan, Jour* 2nd Ser., 31(4):151–155, April **1953.** 4 figs., 2 tables, 3 refs., 5 eqs. In Japanese.—Errors measured precipitation amounts are expressed as a function of rain gage diameter, rainfall intens and rainfall amount. Both theoretical formulation and numerical values are given. A list of various types of rain gages is presented with the indication of the meteorological services in wh they are in use. *Subject Heading:* **1. Rain gage comparisons.**–*G.T.*

10L–342 551.508

Yajima, Y., **On the mechanism of tipping-bucket rain gauge.** *Journal of Meteorological search,* Tokyo, 5(5):423–430, June **1953.** 6 figs., 2 tables, 4 refs., 12 eqs. In Japanese; Engl summary p. 423.—The author calculated properties of the tipping bucket rain gage mechanism in static balance state and found the optimum condition to be $\vartheta_0 = \frac{1}{2}[(\pi/2) - \alpha]$; and then $\vartheta_0 = 25\sim$ (deg.), $\alpha = 40\sim50$ (deg.), where α is the angle of watershed and ϑ the inclination of the bucket. tipping bucket constructed according to this formula will measure rainfall more accurately than earlier model. *Subject Heading:* **1. Tipping bucket rain gages.**—*Author's abstract.*

10L–343 551.508

Yajima, Y., **On the tipping-bucket which is used as the measuring part of rain gauge.** *Jour of Meteorological Research,* Tokyo, 7(2):77–80, March **1955.** 3 figs., table, 8 refs. In Japane English abstract p. 77. **DWB**—In the former paper (*see* preceding item) the author obtained optimum condition for stability of tipping bucket: $\theta_0 = \frac{1}{2}(90° - \alpha)$. In this paper, an attempt is ma to explain this fact in an elementary manner. Some suggestions for making a tipping bucket given. *Subject Heading:* **1. Tipping bucket rain gages.**—*Author's abstract.*

10L–344 551.508

Yajima, Y., **On the siphon-type recording rain gauge.** *Journal of Meteorological Resear* Tokyo, 7(8):520–522, Oct. **1955.** 4 figs., 3 tables, 13 eqs. In Japanese. **DWB**—Description a illustration (with calibration curves and performance graph for siphon tube) of a siphon rain ga for use in mountains where large quantities of rain must be stored. Storage parts, regulating tub floats and siphon pipe are shown diagrammatically. A graph shows relation of temperature of ra to height deviation of recording pen and rainfall amount, and another shows relation of error to ra of rainfall. *Subject Headings:* **1. Siphon rain gages 2. Storage precipitation gages.**—*M.R.*

Rainfall Intensity Gages

10L–345 551.508

Airtronic Research, Inc. Wash., D. C., **Raindicator.** [Letter of inclosure, April 18, 195 2 p. photo.—A large photograph and brief description of a new type of automatic electrocalo metric rainfall indicator which can operate at more than 2000 ft from station, on 110 or 220 v power are included in this report. It indicates the rate of fall of rain or snow by converting wa electrically into steam, and can operate at a sensitivity of <.01″ or on an expanded lower range <.002″. An alarm can be included to indicate beginning of precipitation. Several gages can operated on same recording unit, although the instrument itself makes a continuous record. *Subj Headings:* **1. Recording rain gages 2. Electrocalorimetric rain gages.**—*M.R.*

10L–346 551.508

Frère, M. (*I.N.E.A.C., Belgian Congo*), **Une amélioration du pluviomètre enregistreur à siph O.N.M.** [Improvement of the recording siphon rain gage O.N.M.] *La Météorologie,* Paris, Ser. No. 52:275–276, Oct./Dec. **1958.** 2 figs. **DWB**—The recording siphon rain gage O.N.M. is used the climatological network of the Belgian Congo. The working of the apparatus is defective and t seems to be due to the insufficient hydrostatic thrust of the buoy. The author meets this difficu by increasing the volume of the buoy and reducing its weight. These alterations give a maximu hydrostatic thrust, sufficient to overcome the friction resistance. *Subject Headings:* **1. Recordi rain gages 2. Siphon rain gages.**—*A.V.*

10L–347 551.508

Laycock, P. A., **A home-made rainfall recorder.** *Weather,* 8(8):256, Aug. **1953.** photo Description of a siphon recording rain gage made from simple materials. *Subject Headings:* **1. Ra fall recorders 2. Siphon rain gages.**—*C.E.P.B.*

10L–348 551.508

Liana, Franciszek, **Pluwiograf odległościowy.** [A telemetering rain gage.] *Przegląd teorologiczny i Hydrologiczny,* Warsaw, 8(1):41 42, **1955.** 2 figs., eq. **DWB**—Describes the c

struction and operation of a rain gage recorder equipped with a tipper which can be converted into a distant recorder by connecting a mercury electric contact to the tipper, which is manufactured by the International Division of the Meteorological and Hydrological Institute in Warsaw. The usual deficiencies of tipping bucket gages, i.e., the failure to record small amounts of rainfall, and rainfall occurring during the tipping process, are of little importance in this case because the object of the distant recorder is to register important amounts of rainfall for applications in water supply and flood computations. *Subject Headings:* **1. Tipping bucket rain gages 2. Recording rain gages.** —*A.M.P.*

10L–349 551.508.77

Roberto, Roberti, **Capannina per pluvigrafo.** [Mounting for a rain gage.] *Rivista di Meteorologia Aeronautica*, 12(1):31, Jan./March **1952.**—In regions where the precipitation is often in the form of snow, it is difficult to measure or register the total amount of water accumulated. A system is described and illustrated which allows fairly rapid melting of snow or ice by means of a light globe (70 w) that can be controlled from outside, and that keeps the temperature inside the gage above 0°C. *Subject Headings:* **1. Recording rain gages 2. Snow melt gages.**—*M.R.*

10L–350 551.508.77

Tsukamoto, K., Tsuneoka, S. and Takahashi, K., **A new remote rain gauge and its tests on Odaigahara-San.** *Papers in Meteorology and Geophysics*, 2(2):191–195, June **1951.** 3 figs.—This remote rain gage has a single float as the sensitive element capable of making a contact every 0.1 mm of rainfall. An impulse signal is used in order to save power and increase transmitting capacity and it is generated by "clock work with a rotating vane governor which winds up the float in direct proportion to the rainfall amount." The amount of rainfall recorded on a counter. The design and construction of the apparatus are described with the aid of a diagram and the results of the performance of the rain gage are discussed. *Subject Heading:* **1. Recording rain gages.**—*I.L.D.*

Recording Rain Gages

10L–351 551.508.77

Agari, Shuichi, **On trial manufacture of an ombroscope.** *Journal of Meteorological Research*, Tokyo, 6(9):443–447, **1954.** 5 figs., 4 refs. In Japanese; English summary p. 443. **DWB**—An ombroscope using electric leakage due to rain drops was designed and tested. The leakage affects the electric current in the vacuum tube and actuates a relay which lights a signal lamp and at the same time switches on an extra heater for acceleration of the evaporation of raindrops adhering to the sensing part. The ombroscope is quite sensitive and is promptly signaled even by a slight drizzle. *Subject Heading:* **1. Ombroscopes.**—*Author's abstract.*

10L–352 551.508.77:551.578.11

Dingle, A. Nelson, **Evaluation of a photoelectric raindrop-size spectrometer.** Michigan. Univ. Engineering Research Institute, Contract AF 19(604)-1900, Final Report, Aug. **1957.** 26 p. 13 figs. (incl. photos), table, 2 refs.—The photoelectric raindrop size spectrometer is described, and details of the calibration problem are discussed. Sources of error are examined, and corrective procedures are set forth where possible. Operational characteristics and proposed improvements are outlined. Pertinent elements for consideration in producing an improved future model are presented in the final section. *Subject Headings:* **1. Raindrop size meters 2. Photoelectric raindrop size spectrometers.**—*Author's abstract.*

10L–353 551.508.77

Johnson, John C., **Analysis of optical raindrop spectrometers.** Tufts College. Dept. of Physics. Research Laboratory of Physical Electronics, Contract AF 19(604)-550, Scientific Report No. 2, July 15, **1954.** 42 p. 3 figs., 22 refs.—A theoretical analysis is presented of the factors entering into the design of an optical device for measuring raindrops. The analysis indicates that a camera can be constructed that will record all raindrops larger than 0.5 mm in diameter in a volume of 0.5 cu m of air. The time required for sampling is 50 sec. Both industrial television and photographic film are considered as detectors. *Subject Headings:* **1. Raindrop size meters 2. Spectrometers.**—*Author's abstract.*

10L–354 551.508.77:551.577.36

Litvinov, I. V., **Potochnyĭ samopisets intensivnosti dozhdia.** [Continuous automatic recorder of rain intensity.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 4:381–383, July/Aug. **1955.** 4 figs., eq. **DLC**—A description of a continuous rain intensity recorder containing both a diagram

and photograph of the apparatus and an evaluation of its precision. *Subject Heading:* **1. Rainfa intensity gages.**—*I.L.D.*

10L–355 551.508.3

Lugiez, F. and Dumaine, A. (*both, ingénieurs au Service de la Production Hydraulique d'Electric de France*), **Mesure des précipitations: deux dispositifs améliorant la mesure des précipitations facilitant la transmission à distance des résultats,** [Measurement of precipitation: two instrumen improving precipitation measurement and telemetering.] *International Union of Geodesy and Ge physics, Association of Scientific Hydrology, Toronto, Sept. 3–14, 1957,* [*Transactions*], 1:485–49 pub. **1958.** 4 figs. **DWB**—The Hydraulic Electricity Production Company in France has ma use of two types of precipitation gages to measure the precipitation sounds and the conditions transmitting them a long distance. The characteristic qualities of these instruments have be found to be adequate for much work in precipitation recording. They are being used by the Fren National Meteorological Service observers. A detailed description, diagrams, procedures and resu of their use are contained in this paper. *Subject Headings:* **1. Rainfall intensity gages 2. Telemete ing systems 3. Pluviophones.**—*N.N.*

10L–356 551.508.77:551.578.

Millen, S. G.; Aldaz-Isanta, L. and Keily, D. P., **A brief survey of air-borne raindrop collecti methods.** Mass. Institute of Technology. Dept. of Meteorology. Instrument Laborator Contract AF 19(604)-1287, Scientific Report No. 4, July 15, **1957.** 15 p. 8 figs., 16 refs. **DWB** The general requirements of an air-borne instrument for counting and sizing natural raindrops in t size range 200–5000μ diameter are stated. The characteristics of a variety of instruments a methods for making such counts are examined. *Subject Heading:* **1. Raindrop size distributi instruments.**—*Author's abstract.*

10L–357 551.508.77:551.578.

Spencer, A. T., and Blanchard, D. C., **A portable raindrop recorder for semi-continuous d termination of size distributions.** *American Geophysical Union, Transactions,* 39(5):853–857, Oc **1958.** 5 figs. (incl. photos), 10 refs. **DWB, DLC**—The recorder was designed to obtain adequa drop samples, in the size range of 50–2000μ diameter, at about 2 min intervals for a period in exce of 24 hrs. Successful field use of several instruments in a cloud physics study is indicated and the are described in some detail. *Subject Headings:* **1. Raindrop recorders 2. Raindrop size distributi instruments.**—*Author's abstract.*

10L–358 551.508.7

Takács, Lajos and Zsolnai, János, **Érzékeny csapadéknyomjelző.** [A sensitive raindrc recorder.] *Időjárás,* 57(2):103–108, March/April **1953.** 5 figs. Russian and German summari p. 103. **DLC**—Detailed description of an electric instrument for recording precipitation traces ar scattered drops too weak to be indicated by conventional apparatus. This instrument has bee successfully used at the Hungarian Meteorological Institute since 1950. The instrument's operati is based on an exposed condenser grid. Electric currents created in the circuits closed by raindrop are recorded by a pen attached to a galvanometer. *Subject Heading:* **1. Raindrop recorders.**—*G.*

10L–359 551.508.77:551.578.1

Wittman, John P. and Goodale, T. C. (*U. S. Naval Radiological Defense Lab., San Francis Calif.*), **An automatic water drop collector for field use.** *American Meteorological Society, Bulleti* 36(2):69–72, Feb. **1955.** 5 figs., ref.—An improved instrument for sampling water droplets base upon the method of BLANCHARD is described. It provides a means of remote sampling and a automatic adjustment of the sampling period with the rainfall intensity. "The rain drops a collected in flour filled trays and retained as flour pellets. The collector is triggered by the raindrop and its sampling rate varies with the intensity of rain." *Subject Headings:* **1. Flour pellet techniqu 2. Rainfall intensity gages 3. Rainfall sampling.**—*From authors' abstract. I.L.D.*

SNOW GAGES AND SAMPLERS

10L–360 551.508.77:551.578.41:539.1

Fischmeister, V. (*Linz*), **Bestimmung des Wasserwertes einer Schneedecke mit radioaktive Stoffen.** [Determination of the water equivalent of snow cover by means of radioactive substances *Wetter und Leben,* Vienna, 7(8/11):210–211, **1955.** fig. **DLC**—The "radiation probe" employs t absorption of gamma rays in snow as a criterion of the water equivalent of snow. A diagram of su a device is illustrated and its structure and operation are described. *Subject Headings:* **1. Wat content of snow cover measurement techniques 2. Radioactive snow gages.**—*I.L.D.*

10L–361 551.508.77:551.578.4

Martinec, Jaroslav (*Hydraykuc Res. Inst., Prague*), **Measurement of the snow-water-content with the use of radiocobalt.** *International Union of Geodesy and Geophysics, Association of Scientific Hydrology, Toronto, Sept. 1957,* [*Transactions*], 4:88–96, pub. **1958.** 6 figs., 3 tables, 3 refs., 6 eqs. **DWB, DLC**—A new measuring method based on the absorption of gamma rays by water is investigated to improve the quality and quantity of data of the snow water content in the mountain regions, which are needed for operation of the reservoir system on the Vltava river in Czechoslovakia. In recent years experiments in the Krkonose mountains have been carried out. For a given arrangement of the measuring device the absorption coefficient for water has been found to be a constant for all snow layers up to the water equivalent of 52 in. (132 cm). The values of this coefficient were similar to those obtained in California, where this method was first adopted, and very close to the theoretical value. In the winter season 1955–1956, the experimental snow gaging station at a height of 4600 ft (1410 m) was in action during 5 months with the whole construction snowed up for some time. In order to examine the accuracy of the results continuous measurements of the gamma radiation and of the cosmic background were made and the statistical deviations of the radiation investigated. Relationships between the duration of a single measurement, the intensity of the gamma radiation and the accuracy of the result have been derived. *Subject Heading:* **1. Radioactive snow gages.**—*Author's abstract.*

10L–362 551.508.77:551.578.4

Ônuma, Masayuki (*Branch ST, Snowy Dist. of Agriculture, Yamagata*), **Measurement of water equivalent of deposited snow by snow sampler.** *Researches on Snow and Ice,* Tokyo, No. 2:149–155, Jan. **1955.** 3 figs., table, 44 refs. In Japanese. **DWB**—Brief histories, functions and descriptions of snow sampler, totalizer, radioactive snow gage and snow recorder used in America and Japan are given. Snow sampler tube, whose length is 30 in. or 75 cm in Japan and whose effective diameter ranges from 1.5–8 in., is generally made of duralumin, providing proper coating for smooth sliding of snow core. The knife edge has several serrated cutters. Totalizer, whose diameter is around 12 in. (the Japanese ranges from 20–50 cm) is generally equipped with wind shield and $CaCl_2$, or ethylene glycol is used as antifreeze in the tank. *Subject Headings:* **1. Snow instruments 2. Snow totalizers.**—*J. H. Woo.*

10L–363 551.508.77:551.578.4:539.16

Ônuma, Masayuki (*Branch ST, Snowy Dist. of Agriculture, Yamagata*), **The radioactive snow gage.** *Researches on Snow and Ice,* Tokyo, No. 2:139–147, Jan. **1955.** 7 figs., 7 tables, 1 photo, 6 refs., 3 eqs. In Japanese. **DWB**—The radioactive snow gage consists of Co^{60} contained in Al. tube and Geiger-Müller tube. Snow cover depth, *HSW* is calculated: $HSW = (\log I/I_0)/\mu_x$ where I and I_0 are intensities of radiation rays in counts per sec with snow cover and without; μ_x is radiation absorption coefficient of water; $\mu_x = 0.0456^{-cm}$ obtained experimentally. Snow cover depth is measured by using a radioactive snow gage and snow sampler (eff. dia. 79.8 mm). The comparative results of both methods are tabulated and the range of standard deviation and relative % errors of each function variable are discussed. The study of consecutive observations of snow cover by radioactive and ordinary snow gages and snow sampler proves the superiority of the radioactive method over others. *HW* (snow cover depth), *HSW* (water equivalent of snow cover) and snow cover density are comparatively graphed. *Subject Heading:* **1. Radioactive snow gages.**—*J. Woo.*

10L–364 551.508.77:551.578.4

Tamura, M. and Tsuda, N. (*both, Met. Res. Institute, Tokyo*), **A new recording snowgage, buried-type.** *Papers in Meteorology and Geophysics,* Tokyo, 9(2):87–95, Dec. **1958.** 12 figs. (incl. photos), table, eq. Japanese summary p. 94. **DWB**—A buried-type snow gage is introduced which measures and records the amount of snow cover in the natural state as snow lies on the ground. A pit is dug with a 4 m diameter and with 30 cm depth and a loop-type strain meter is intalled on a foundation at its center. Foundations are also made along the circumference, and beams are put circularly and radially between these foundations and from them to the strain meter at the center. The beams support plates on them, on which soil coverage is spread until its surface is level with the surrounding ground. The strain at the center, which is equal to $\frac{1}{3}$ of the weight of snow cover on the circle, is magnified and transferred with links to a recorder 4 m apart from the center. From the fact that the result of the test measurement made at Hokkaido University campus agrees very well with that of the simultaneous observations with a snow sampler, the gage seems quite satisfactory for practical use for the measurement of snow cover. *Subject Heading:* **1. Snow gages.**—*Authors' abstract.*

10L–365 551.508.79:551.578.46

Wallenta, R. (*Vienna*), **Die Gebirgs-Schneesonde des Öst. Hydrographischen Dienstes und Ergebnisse von Schneesondierungsfahrten.** [Mountain snow sondes of the Austrian Hydrographic

Service and results of snow soundings.] *Wetter und Leben*, 5(1/2):30–31, March **1953.**—The mountain snow sonde consists of a light metal sonde tube 50 cm long graduated in cm with a 50 cm^2 opening, extensible rod and various accessories. A sample measurement of snow thickness is given. *Subject Heading:* **1. Snow sondes.**—*I.L.D.*

10L–366 551.508.77

Yajima, Y., **On the snow sampler.** *Journal of Meteorological Research*, Tokyo, 7(4):231–237, June **1955.** 6 figs., 10 tables, ref., 7 eqs. In Japanese; English summary p. 231. **DWB**—The author discusses the snow sampler and obtains the following results: (1) The suitable inside diameter of the sampling cutter is about 5.0 cm, and then we must use the 0.20 cm thickness of sampling tube (aluminum alloy) which is used for 6 m in snow depth. (2) The density measured by the sampler cutter with an inside diameter of 5.0 cm has an accuracy of ±0.02. (3) If we want to have the density accuracy of ±0.01, in cases of 1–3 and 3–6 m in snow depth, we must use the sampler cutter with an inside diameter of 5.0 cm and the balance sensitivity of ±10 g and ±50 g, respectively. *Subject Heading:* **1. Snow samplers.**—*Author's abstract.*

10L–367 551.508.77

Yoshida, S. and Saito, K., **Some experiments on totalizers.** *Journal of Meteorological Research*, Tokyo, 7(10):650–662, Dec. **1955.** 9 figs., 5 tables, 11 refs. In Japanese; English summary p. 650. **DWB, DLC**—The authors carried out experiments on totalizers (snow storage gages) at Shinjo City, Yamagata Prefecture, during the winter 1954–1955. (1) From measurements of $CaCl_2$, concentration and minimum temperature of its solution, plus the observation of freezing in the calcium chloride solution in various dimensions of totalizers, it was shown that the larger the diameter of the storage body (in comparison with that of an orifice) the more effective is the preventive measure of freezing. (2) When the depth of the initial calcium chloride solution exceeds a certain limit (15–20 cm in our experiment), we cannot expect as great an increase of the preventive effect of freezing. (3) Relationships between wind velocity and catching characteristics of totalizer in various types are presented. (4) The following conditions are found necessary for totalizers to catch snowfall satisfactorily: (a) The diameter of an orifice must be greater than 20 cm; (b) Use of a stand pipe type near an orifice; (c) It is necessary to attach an adequate windshield (e.g. modified Alter I-type, etc.). *Subject Heading:* **1. Snow gages.**—*Authors' abstract.*

OTHER INSTRUMENTS FOR MEASURING HUMIDITY, EVAPORATION, PRECIPITATION, CLOUD CHARACTERISTICS, ETC. (551.508.79)

Precipitation Gage Shields

10L–368 551.508.799

*Tret'iakov, V. D., **Izmerenie atmosfernykh osadkov.** [Measurement of atmospheric precipitation.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, No. 34(96):30–40, **1952.** 9 figs., 8 tables, 7 refs. **DLC**—On the basis of experimental data the author discusses the reliability of precipitation collectors with special reference to the types of collectors and shields. The discussion includes an analysis of wind behavior within a continuous fence surrounding a precipitation collector, the efficiency of a grill type of shield in snow collection, and a description of the structure (illustrated by diagram) of precipitation gages with grill type shields. The behavior of these gages under different wind conditions; the effect of size and shape of shield; height of gage, and ground surface; comparison of observations made with a rain gage and precipitation meter with reference to snow fall; comparison of a rain gage fall with a lathe shield and a precipitation meter, etc. are analyzed and the numerical observations are presented in tables. *Subject Headings:* **1. Precipitation gages 2. Precipitation gage shields 3. Rain-snow recorders.**—*I.L.D.*

10L–369 551.508.79

Weiss, L. L. and Wilson, W. T., **Precipitation gage shields.** *International Union of Geodesy and Geophysics, Association of Scientific Hydrology, Toronto, Sept. 3–14, 1957, [Transactions]*, 1:462–484, pub. **1958.** 10 figs., bibliog. p. 475–484. **DWB**—A comprehensive survey of the literature has been made, and is summarized to give the development and present status of windshields for precipitation gages. In addition to describing various kinds of shields and discussing their performance consideration is given to criteria for their use. An attempt is made to define the area of agreement on desirable properties for shields, and suggestions are offered for future work to broaden this area. *Subject Heading:* **1. Precipitation gage shields.**—*Author's abstract.*

River Gages

10L–370 551.508.79:551.579.4

Eschweiler, Walter, **Entwicklung und Bedeutung des Pegelwesens am Rhein.** [Development and importance of the level measurements on the Rhine.] *Wasserwirtschaft*, Sonderheft, p. 5–9, **1952.** 9 figs.—The history of gages on the Rhine is set out and the present gages illustrated—autographic recording and display, and transmission of levels. The flood forecasting service and its difficulties are briefly described. *Subject Heading:* **1. River gages.**—*C.E.P.B.*

10L–371 551.508.79:551.579.4

Krasheninnikov, M. V., **Raboty gidrometeostantsii Napas.** [A procedure used at Napas hydrometeorological station.] *Meteorologiia i Gidrologiia*, Leningrad, No. 3:57, March **1957. DWB, DLC**—In order to speed up the analysis and verification of the water discharges at the Napas Station (Western Siberian Hydrometeorological Service) a calibration table was constructed for the rotating gage on the basis of the equation $V = 0.251n + 0.019$. *Subject Heading:* **1. River gage scales.**—*I.L.D.*

10L–372 551.508.79:551.579.4

Totomanov, I., **Avtomaticheskiĭ stokomer.** [Automatic flow meter.] *Meteorologiia i Gidrologiia*, Leningrad, No. 8:60–61, **1957.** 2 figs. (diagr. and photo). **DLC, DWB**—The construction of an apparatus for measuring the discharge of rivers and canals is described with the aid of a photograph and diagram. Its use requires that the trough of the water body at the point of measurement be constant and also that a preliminary discharge curve be constructed. Changes in the water level are transmitted to a float, a thin wire and a pulley to whose axis a measuring disc is attached. This disc is calibrated according to discharge curves which are specific for each point. The principle of operation of this device is described with the aid of equations. *Subject Heading:* **1. River gages.**—*I.L.D.*

Soil Moisture Measurement Instruments

10L–373 551.508.79:551.579.5

Akimtsev, V. V.; Kudriavtsev, M. N. and Sadimenko, P. A., **O pribore PK-2 prof. F. E. Koliaseva dlia opredeleniia vlazhnosti pochvy.** [Apparatus PK-2 by Prof. F. E. Koliasev for determination of soil moisture.] *Pochvovedenie*, Moscow, No. 11:97–99, Nov. **1955.** 2 figs., 3 tables, 3 refs. **DLC**—The method for determining soil moisture is based upon the relationship between soil moisture and its capacity to diminish in volume under pressure. The soil moisture is determined directly. A diagram of the apparatus, a description of its use and data on soil moisture obtained with it are presented. *Subject Heading:* **1. Soil moisture measurement instruments.**—*I.L.D.*

10L–374 551.508.79:551.579.5

Bolt, G. H. (*Agricult. Univ., Wageningen, Netherlands*), **De bepaling van het vochtgehalte en het volumengewicht van de bodem met behulp van neutronen en γ-stralen.** [Determination of soil moisture and density by means of neutrons and γ rays.] *Landbouwkundig Tijdschrift*, Wageningen, 70(Extra No.):282–286, May **1958.** 4 refs. **DA**—Several methods for determining soil density and soil moisture by means of neutrons and γ rays are explained. The use of neutrons and γ rays is based on the scattering of these rays in the soil, under energy loss. The energy loss of a neutron is maximal when it collides with an H-nucleus whereas for γ radiation with an energy of 1 mev, the absorption coefficient per unit of mass is fairly constant for all elements with atom number between 2 and 30. It follows that soil moisture is measured by means of neutrons and soil density by means of γ rays. *Subject Headings:* **1. Soil density measurement techniques 2. Soil moisture measurement techniques.**—*A.V.*

10L–375 551.508.79:551.579.5

Botha, A. D. P., **Apparaat vir die bepaling van de infiltrasiespoed van water in 'n grond.** [Apparatus for measuring the infiltration rate of water into soil.] *South African Journal of Agricultural Science*, Pretoria, 2(2):261–264, June **1959.** 2 figs. **DLC**—The working principle of an apparatus is described, by which a continuous measuring of the infiltration rate of 50 cm water into a soil is possible. In this apparatus the soil is in continuous contact with a water column which exerts a pressure of only one in., its weight being eliminated by a vacuum in the upper part of the apparatus. The working of the apparatus is clearly shown by diagrams. *Subject Headings:* **1. Infiltrometers 2. Soil moisture measurement instruments.**—*A.V.*

10L–376 551.508.79:537.311:551.579.5

*Danilin, A. I., **Omicheskii metod izmereniia vlazhnosti pochvy s primeneniem ugolnykh elektrodov v steklovolokne.** [Ohmic method of measuring soil moisture by means of coal electrodes in

glass wool.] *Leningrad. Nauchno-Issledovatel'skiĭ Institut Gidrometeorologicheskogo Priborostroeniia, Trudy*, No. 5:52–78, **1957.** 8 figs., 11 tables, 12 refs. **DLC, DWB**—The results of experimental investigation of the application of the resistance method to soil moisture, why this method is not used widely (the defects of naked metal electrodes) and various methods utilizing the resistance technique are summarized. The construction and operation of soil moisture sensing elements made out of carbon and gypsum using an environment of glass wool, river sand or gypsum enabling the measurement of soil moisture in a range from field capacity to atmospherically dry soil is described. The accuracy of soil moisture measurements by means of electrical resistance between electrodes and glass wool if temperature corrections are taken into account is of the same order as of thermostat desiccation. Measurement of soil moisture with carbon elements requires about one min and when made at 10 depths with four-fold repetition a maximum of 1.5–2 hrs. Photographs of the instrument developed, and the method of its operation and calibration are presented and the results of measurements are given in tables. *Subject Headings:* **1. Electric soil moisture measurement instruments 2. Soil moisture measurement techniques 3. Soil moisture measurements.**—*I.L.D.*

10L–377 551.508.79:551.579.5

Danilin, A. I., **Ob izmerenii vlazhnosti pochvy.** [Measurement of soil moisture.] (In: U.S.S.R. Glavnoe Upravlenie Gidrometeorologicheskoĭ Sluzhby, **Voprosy agrometeorologii,** ed. by F. F. Davitaia and M. S. Kulik. Moscow, **1958.** p. 11–17. 13 refs., 6 eqs.)—Present day methods of measuring soil moisture comprise two groups: one group involves the measurement of the moisture of soil samples, and the other group includes methods and apparatus for measuring soil moisture in situ. These methods are listed and described briefly and the various defects presented by the different methods are summarized. A detailed account is given of the underlying principles of the method and the procedure of measuring soil moisture by using gamma radiation. This measurement procedure has two variants. In one the water content of a meter soil layer is determined by means of a bundle of gamma rays. Two tubes with an internal diameter of 30 mm are placed in the soil at an angle of 45°. The first tube is placed in such a way that its lower end is at a depth of 50 cm; the second is placed in the same place as the first with its lower end no deeper than 100 cm. In the first tube the isotope Co60 with an activity of 8 mg radium equivalent is placed; the counter is let down into the second tube. The second variant permits the radiation of the soil by a horizontal bundle of gamma rays so that moisture content can be measured in soil layers of 10, 20, 30 etc., to 100 cm. If the initial intensity of gamma rays (I_0) for a known initial soil moisture (W_0) is known the soil moisture content at any moment is given by $W = W_0 \pm DW$ where W = soil moisture in per cent at the depth measured, W_0 = initial soil moisture in per cent at the same depth at which I_0 is measured and DW = variation of humidity in per cent computed by $DW = (10/\rho H)(\ln I_0 - \ln T_1)\mu$ where ρ = total weight of soil, H = thickness of soil layer per mm. *Subject Headings:* **1. Soil moisture measurement instruments 2. Soil moisture measurement techniques.**—*I.L.D.*

10L–378 551.508.79:551.579.5(65)

Dervieux, F., **La nappe phréatique du Souf (Région d'El-Oued, Algérie).** [The phreatic water sheet in the Souf (El-Oued region, Algeria).] *Terres et Eaux*, Algiers, 9(31):34–35, **1958.** 2 figs.—Modifies a section of the previously published paper (No. 29, p. 12), due to changes brought about by the authors on one of the instruments employed (apparatus for measuring the capillary conductivity coefficient of sand). Appended charts and curves are intended to replace those appearing in the corresponding section of the previous paper. *Subject Headings:* **1. Ground water 2. Capillary conductivity coefficient of sand 3. El-Oued, Algeria.**—*A.V.*

10L–379 551.508.79:551.579.5

*Jackson, D. C. (*Fed. Dept. of Conservation and Extension*), **Some preliminary indications of soil moisture changes under arable crops.** *Rhodesia Agricultural Journal*, Salisbury, 55(4):426–438, July/August **1958.** 9 figs. (including photos), 4 refs. **DLC**—In 1953 research was started at Henderson Research Station to measure soil and water losses under various crops by erosive processes. In 1954 a pilot experiment was commenced on the same plots using electrical resistance Bouyoucos type rectangular gypsum moisture blocks. The object of this experiment was to indicate trends of water usage at 1′, 3′ and 5′ depths in the soil by different crops, under local conditions of rainfall and runoff. The crop treatments were: 1) continuous maize at high low levels of fertility; 2) alternate green manure, maize crop; 3) long pasture rotations of Star grass and Napier fodder. Instruments used and methods of placing the blocks are described. Details of treatment on plots are given. Charts give for each crop the rainfall per week in in. and the resistance in ohms for the period March 1955–Feb. 1957 at 1′, 3′ and 5′ depth. A comparison of the individual charts is made. *Subject Headings:* **1. Soil moisture research 2. Water use by plants 3. Runoff data.**—*A.V.*

10L–380 551.508.79:631.43:551.579.5

Kreutz, W., **Volumänderung der Bodenoberfläche in Abhängigkeit vom Wetter.** [Change of volume of the soil according to weather.] *Meteorologische Rundschau*, 6(7–8):138–140, July–Aug. **1953.** 4 figs. **DWB**—At Giessen a recording "earth feeler" was constructed, in which the vertical movements of a cross placed on the ground actuate a pen arm. Movements up to 13 mm were recorded. Records in Feb. 1953 on humus and loess are compared with temperature records, showing clear opposition. *Subject Headings:* **1. Soil volume measurement instruments 2. Soil mechanics.** —*C.E.P.B.*

10L–381 551.508.79:551.579.5

Krijnen, H. J. M., **Toestel voor de bepaling van de doorlatendheid van grond.** [Apparatus for the determination of the permeability of the soil.] *Netherlands. Directie van den Landbouw, Mededeelingen [van de] Directeur van de Tuinbouw*, 21(8/9):503–508, Aug./Sept. **1958.** 3 figs., 2 tables—A description is given in this article of a simply designed pricking cylinder which makes it possible to test the topsoil in horticultural land for its permeability by water. Difficulties with other methods, such as the disturbance of the natural position of the soil particles, the influence of lower, less permeable layers and the original humidity of the soil, are avoided with this method. Besides, the determination in the field makes transport to a laboratory superfluous. The method takes relatively little time (10 to 30 min per determination) and gives sufficiently reliable results under equal conditions. *Subject Heading:* **1. Soil permeability measurement instruments.**—*A.V.*

10L–382 551.508.79:551.579.5

Mäde, Alfred, **Zur Methodik der Bodenfeuchtigkeitsmessungen.** [On the method of soil humidity measurement.] *Germany. Deutscher Wetterdienst in der U. S. Zone, Berichte*, No. 38:195–197, **1952.** 2 figs., table. **DWB**—For determination of volume % of soil moisture, a soil sampler is described which penetrates a depth of 1 m. Comparisons with % by weight are given. *Subject Heading:* **1. Soil moisture measurement instruments.**—*C.E.P.B.*

10L–383 551.508.79:551.579.5

Stockwell, Homer J. (*Soil Conservation Service, Fort Collins, Colo.*), **One year's experience with electrical soil moisture units.** Fort Collins, Colo., **1954.** 7 p. +4 figs. Mimeo. **DWB** (M79.2 S866on)—This report explains the use of electrical resistance soil moisture units as a partial solution to an index of soil moisture and of how it can be applied to forecasting procedure. It contains the results of the investigation conducted in the western states on the effects of watersheds on the seasonal accumulation of snow water as reported by the Snow Survey Leader, Soil Conservation Service, Fort Collins, Colo. and presented at the Snow Surveyors' School, McCall, Idaho on January 19, 1954. Principles used for the location of the units are also discussed. *Subject Headings:* **1. Electrical soil moisture measurement instruments 2. Soil moisture forecasts.**—*N.N.*

10L–384 551.508.79:551.579.5

Thames, John L. (*Forest Service, U. S. Dept. Agriculture, New Orleans, Louisiana*), **Measuring soil moisture over large areas with single installations of moisture units.** *Journal of Geophysical Research*, Wash., D. C., 64(2):257–262, Feb. **1959.** 2 figs., 3 tables, 8 refs. **DLC**—It seems possible that, with proper calibration, single installations of electrical soil moisture units can be used to estimate moisture contents of outlying sites receiving similar amounts of rain but differing in vegetation and soils. In tests with data from northern Wisconsin and west central Mississippi, predicted moisture contents agreed closely with those obtained by on-site measurements. Results were most accurate at seasons when the soils remained near the wilting point or near field capacity and were least accurate during periods of recharge. *Subject Heading:* **1. Soil moisture measurement instruments.**—*Author's abstract.*

Water Level Gages

10L–385 551.508.79:551.579

Gusev, O. V., **Minimal'naia reĭka.** [The minimum water level gage.] *Meteorologiia i Gidrologiia*, Leningrad, No. 3:50–52, March **1956.** fig. **DWB, DLC**—This minimum water level gage is based upon the principle of a miniature cork float structure by means of which a spool of thread unwinds when the water level falls. When the water level rises between the fixed intervals of observations, the cork float rises but the spool of thread does not unwind. The construction of this minimum gage is described with the aid of a diagram. *Subject Heading:* **1. Water level gages.** —*I.L.D.*

10L–386 551.508.79:551.579.5:550.34

Keil, Heinrich, **Registrierung von Erdbeben durch einen Grundwasser-Pegel im Wasserwerk Inheiden.** [Recording of earthquakes by a ground water level recorder at the Inheiden waterworks.] *Meteorologische Rundschau*, 6(3/4):57–58, March/April, **1953.** 4 figs.—Ground water level is automatically recorded and the traces, besides closely following barometer level (6 mm barometer rise = 4 cm fall of water level) show kicks representing distant earthquakes. *Subject Headings:* **1. Water level recorders 2. Earthquake recorders.**—*C.E.P.B.*

10L–387 551.508.79:551.579

Spengler, Wolfgang (*Geismar bei Göttingen*), **Theoretische Grundlagen und Fehlerberechnung von Druckluftpegeln.** [Theoretical basis and computation of errors of compressed air water level gage.] *Die Wasserwirtschaft*, Stuttgart, 46(3):69–75, Dec. **1955.** 6 figs., 3 tables, 5 refs., 26 eqs. **DLC**—Temperature, pressure and humidity of the air affect the accuracy of the compressed air water gage. These factors are considered here for the first time in detail. It is possible to achieve an accuracy of 1 cm on a water level of 5 m. Continuous addition of air increases the accuracy. Additional errors (3–4 cm on 5 m) originate in tidal regions of rivers. *Subject Heading:* **1. Water level gages.**—*A.A.*

Miscellaneous

10L–388 551.508.79:551.521

Bologna, J. M.; Larison, O. K. et al. (*all, Electronics Division, U. S. Naval Res. Lab., Wash.*, D. C.), **An airborne Lyman-α humidiometer.** *U. S. Naval Research Laboratory, NRL Report*, 5180, Aug. 12, **1958.** 11 p. 9 figs., 3 refs. **DWB** (M(055) Uf86r)—A simple, lightweight instrument with rapid response, has been developed for the direct measurement of atmospheric water vapor density. The operation of the instrument is based upon the high (387/cm) absorption coefficient of water vapor for the Lyman-α (1215.6 A) line of hydrogen. A small glass glow tube, filled to 0.2 mm with hydrogen, emits radiation at Lyman-α. The radiation traverses a 4-cm measuring path and enters a nitric oxide gas photoionization chamber. For fixed geometrical and electrical parameters, the resulting ionization current is determined by the water vapor density in the path, other atmospheric gases having negligible effects. A preliminary humidiometer using this principle has been evaluated in the laboratory and in flight tests. A University of Texas refractometer mounted in the test aircraft allowed simultaneous and independent rapid response measurements of atmospheric humidity. Comparison of the humidiometer and refractometer data indicate the accuracy, sensitivity, and speed of response of the humidiometer. It is considered that the humidiometer is potentially satisfactory for balloon-borne or dropsonde applications. *Subject Headings:* **1. Refractometers 2. Humidiometers 3. Water vapor density measurement instruments. I. Randall, D. L. II. Ringwalt, D. L.**—*Authors' abstract.*

10L–389 551.508.79

Bourciez, J., **Les mesures industrielles d'humidité.** [Industrial measurements of humidity.] *Electronique Industrielle*, Paris, No. 23:191–196, Nov./Dec. **1958.** 7 figs., ref. **NN**—Description and essential characteristics of an apparatus permitting the determination of the rate of humidification without manipulation of the substance. The measure is automatic and can be read on a graduated scale. The apparatus is based on the process of desiccation in a drying room. The author describes the method step by step. The second part describes instruments permitting the determination of the rate of humidification of a substance through measuring the fluctuations of the dielectric constant relative to the water contained in this substance. This apparatus might be used for measuring the humidity of the soil. *Subject Heading:* **1. Humidity measurement instruments.** —*A.V.*

COMBINED INSTRUMENTS (551.508.8)

10L–390 551.508.8

Manuilov, K. N., **Ispol'zovanie uprugikh zven'ev v mekhanizme barotermogigrometra BM-1.** [Use of elastic links in the mechanism of the BM-1 barothermohygrometer.] *Leningrad. Nauchno-Issledovatel'skiĭ Institut Gidrometeorologicheskogo Priborostroeniia, Trudy*, No. 5:121–129, **1957.** 4 figs., table, 9 eqs. **DWB, DLC**—In the construction of the barothermohygrometer BM-1 cylindrical tape springs are used; these present a new type of elastic link fulfilling the functions of a transmission mechanism. From calculations of cylindrical tape springs a formula relating the transmission ratio of the spring to its geometrical dimensions was derived; a method for calculating the error of the mechanism produced by the nonlinear relationship $\varphi = f(A)$, (where φ = angle of winding of the spring of one direction in radians, and A = total length of the spring) and the effect of flexible and nonrigid

elements of the apparatus upon the transmission ratio was analyzed. The construction of the barometer and hygrometer units is described with the aid of a photograph and diagram and equations describing the operation of the mechanisms of these measuring units are presented. *Subject Heading:* **1. Barothermohygrometers.**—*Based on author's conclusions and I.L.D.*

10L–391 551.508.8

Schultz, Herbert B. and Brooks, Frederick A. (*both, Univ. of Calif., Davis, Calif.*), **A spot climate recorder.** *American Meteorological Society, Bulletin,* 37(4):160–165, April **1956.** 4 figs., 2 tables, 14 refs. **DWB, DLC**—A description with the aid of a photograph and diagram of a spot climatic recorder capable of registering continuously and simultaneously, dry bulb, wet bulb and globe temperatures and wind direction and velocity on daily or weekly charts. Dry and wet bulb temperatures are measured with capillary tube thermometers, black bulb temperature is measured by inserting a $\frac{3}{8}$ in. diameter temperature element in a hollow 8-in. copper float and wind by contact anemometers, the signals of which are transmitted by a 6 v storage battery. The shelter so designed as to provide natural ventilation and light and smaller than a Stevenson screen is described. Data are given on a comparison temperature of spot climate recorder, thermograph and ventilated psychrometer on nearly calm days and on dew point measurements on nearly calm days. *Subject Headings:* **1. Climatological observation instruments 2. Recording equipment.**—*I.L.D.*

AEROMETEOROGRAPHS (551.508.82)

10L–392 551.508.82:551.507.352

Beelitz, P., **Meteorographen an Flugzeugen.** [Meteorographs on aircraft.] *Die Technik,* Berlin, 12(5):343–348, May **1958.** 5 figs., 11 refs. **DLC**—A history of meteorographs, from those attached to free or captive balloons to those used on aircraft is given. Performance characteristics of several types of meteorographs (Bosch-Lindenberg, Bosch-Cannegieter, Wigand-Koppe-Fuess, Raethjen-Frankenberger, P. Lautner, and some foreign models) are indicated, and photographs of the instruments are presented. The evaluation of meteorograph records is discussed. *Subject Heading:* **1. Aerometeorographs.**—*G.T.*

10L–393 551.508.82:551.507.352

Cook Research Laboratories, Skokie, Ill., **Unitary decimal digital recording system.** Contract AF 33(038)-23324, Interim Report PR 17-13, Oct. 26, **1954.** 16 p. 24 figs. (incl. photos). **DWB**—Data to be recorded by an air-borne meteorological recording system should include the following data on conditions immediately surrounding the aircraft, as follows: pressure altitude (Z_p), absolute height (Z), altimeter correction (D), temperature (T), moisture content, air speed, drift, icing, vertical accelerations, clouds and precipitation, and dropsonde observations. Desirable characteristics of recording equipment, records and system are treated in theory, and equipment designed for optimum efficiency is described and illustrated. The unitary decimal recording system represents a feasible solution to manual and automatic data handling of air-borne equipment records; actual experience in use of records (playback) has shown considerable merit in this system which is being developed further. *Subject Headings:* **1. Air-borne instruments 2. Recorder records 3. Aircraft weather reconnaissance data.**—*M.R.*

10L–394 551.508.82

Harney, P. and Rounds, W., Jr. (*Geophysics Research Directorate*), **Aerograph (L-20) temperature and humidity data.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 1:299–302.) **DWB**—Detailed temperature and humidity measurements in the lower few thousand feet of the atmosphere were made at O'Neill by means of a liaison type plane "The Norseman" or L-20, equipped with a Kollsman KS-4 Aerograph. In this paper the author describes the physical characteristics of the aerograph, which records automatically temperature, air speed and relative humidity, including the various sensing elements and their mounting; the operation of the aerograph during flight and the method of taking readings, the calibration of the instrument, and instrumental errors. *Subject Headings:* **1. Aerometeorographs 2. Air-borne instruments.**—*I.L.D.*

10L–395 551.508.82:551.507.352

Shmeter, S. M. and Shur, G. N., **Elktrometeorograf dlia samoletnykh issledovanii.** [Electrometeorograph for airplane investigations.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy,* No. 22:3–8, **1957.** 3 figs., 2 refs., eqs. **DWB**—A description with the aid of block and circuit diagrams of the construction and operational characteristics of an electrometeorograph for airplane investigations developed by the authors at the Central Aerological Observatory. It is characterized by high precision and an unlimited recording duration since the tape can easily be loaded in flight.

It contains an optical recorder capable of recording simultaneously temperature and pressure, as well as vertical acceleration and vertical aceleration of the center of gravity of the airplane, a resistance thermometer, a static pressure receiver of type NU-8202, a potentiometric indicator of load direction panel, etc. The calibration of the electrometeorographs for temperature and humidity and the computation of air temperature from the record by the equation $\Delta T = T_T - T_a = k(\rho_0/\rho_H)(v^2_{\text{ind}}/2000)$, where $k = 2000(\rho_H/\rho_0)(T_{T_1} - T_{T_2}/v_1{}^2_{\text{ind}} - v_2{}^2_{\text{ind}})$ are described. *Subject Headings:* **1. Electrometeorographs 2. Aerometeorographs.**—*I.L.D.*

RADIOSONDES AND RAWINSONDES (551.508.822)

Radiosondes

10L–396 551.508.822

Beelitz, Paul, [**The operation of the radiosonde service of the DDR during the International Geophysical Year**]. Transl. of the original German in *Radio und Fernsehen*, Berlin, No. 13:411–413, July **1957.** 6 figs., 5 refs. Transl. available **DWB** (MO8.812 B414op)—Since 1930 when the first radiosonde was launched 15–20 different types of the instrument have been constructed. The performance of this instrument has been greatly improved. During the International Geophysical Year the World Meteorological Organization recommended its use for the forecasting of weather internationally. Details of the discussions in this report cover the duties of the radiosonde service, its operations during the IGY and its attainments in upper wind measurements. *Subject Headings:* **1. Radiosondes 2. Radiosonde improvement 3. IGY radiosonde program.**—*N.N.*

10L–397 551.508.822

Haig, Thomas O. and Lally, Vincent E. (both, *GRD, AF Camb. Res. Center*), **Meteorological sounding systems.** *American Meteorological Society, Bulletin*, 39(8):401–409, Aug. **1958.** 4 photos, 10 refs. **Comments** by G. D. Barbe and **Reply** by Lally. *Ibid.*, 41(1):31–32, Jan. **1960.** 5 refs. **DWB, DLC**—The authors describe the development, operation and results obtained by vertical and horizontal sounding systems for measuring directly atmospheric pressure, temperature, wind field and water vapor (aircraft sounding systems are excluded). The contents of this paper include the following: a history of meteorological soundings since 1749, the most important developments being described briefly up to the introduction of rawinsonde SCR-658 in 1944; the use of radiosonde systems throughout the world, the construction, and accuracy of the temperature, humidity and pressure elements and the principal methods of telemetering radiosonde data (audio or frequency modulation of a carrier by the sensing elements, code type radiosondes and chronometric radiosondes); computation of pressure-height data; balloon capabilities; wind measurements by pilot balloon and theodolite radar systems and AN/GMD-2 rawinsonde system; rocket and projectile sounding systems and horizontal sounding systems such as constant level balloons and the operational characteristics of constant level balloons. *Subject Headings:* **1. Meteorological sounding systems 2. Radiosondes 3. Telemetering systems.**—*I.L.D.*

10L–398 551.508.822

Kostarev, V. V., **Radiozond bez peredatchika.** [Radiosonde without transmitter.] *Meteorologiia i Gidrologiia*, No. 3:83–86, **1956.** 3 figs. **DWB.** Transl. into English by M. I. Weinreich, issued by Sandia Corporation, Albuquerque, N. M., as its SCL-T-172. Available **DWB** (MO8 K86ra). Translation includes photostat of original Russian and figs.—Radiolocation is now used in meteorological observation for determining winds behind clouds, altitudes and volume of cloudiness. The structure of this new instrument, the applicational principle of the radiolocator sonde, the ground installation of it for the reception of sonde signals, and the results of experiments conducted with it and the consequences of such experiments are all presented in this report. *Subject Headings:* **1. Radiosondes 2. Rawinsonde techniques.**—*N.N.*

International Radiosonde Comparisons

10L–399 551.508.822

Cline, Dudley E., **International radiosonde comparison tests.** *U. S. Army Engineering Laboratories, Fort Monmouth, New Jersey, Technical Memorandum*, No. M-1907, Aug. 2, **1957.** 16+p. 66 figs. (mostly photos),—Includes: Harmantas, C., **Notes on the world comparison of radiosondes, Payerne, Switzerland, May–June 1956.** Wash., D. C., U. S. Weather Bureau, **1957(?).** 3 p. 7 figs. (incl. tables). (Available for ref. **DWB,** in separate binding. MO9.822 U587n)—Besides many excellent photos of launchings and equipment a photo shows the 78 participants (listed and marked) from 16 countries, who attended the International radiosonde tests at Payerne from May 21 to June

1956. History of Joint Sub-Commission for Experimental Aerology instituted at Toronto in 1946 d affiliated with CIMO and CAE; the first International comparisons in May 1950 and the second May 1956, are briefly reported. Shipment and maintenance of U. S. equipment, comments con- ning flights, philosophy of tests, description and comments on foreign equipment, and conclusions e included. Although U. S. equipment stood rough shipment handling, little maintenance of U. S. ound or flight equipment was required. Wide difference was found between various types, and urces of error were found in U. S. equipment even though it stood up favorably in comparison. nong the errors were radiation (long wave) effects on temperature elements, and wet bulb effects on ving a cloud. *Subject Headings:* **1. International radiosonde comparisons 2. Payerne, Switzer- nd.**—*M.R.*

10L–400 551.508.822

*Kitaoka, Tatsumi, **On the comparison between Japanese and USAF radiosonde, Reports 1, 2 d 3.** *Tateno, Japan. Aerological Observatory, Journal,* 5(4):260–281, March **1954.** figs., tables. so his: **Results of statistical investigation of the temperature discrepancy between the Japanese and SAF radiosonde observations.** *Ibid.,* p. 282. 2 figs.—Comparisons made at Haneda Raob ation 3 times during the day and 4 times at night on April 8 and 17, 1953, with 7 observers from MO and 4 from the U. S. Air Weather Service participating are tabulated, presented graphically d discussed. Differences of pressure and of temperature at the same instant, and at standard vels are also shown graphically. Pressure differences vary from observation to observation in a ndom manner, but temperature differences vary systematically with height. Differences are at a aximum at about 300 mb and minimum at 150 mb and then increase again above 150 mb. The ne lag coefficient of Japanese radiosonde is greater than that of USAF radiosonde. The second per shows annual and seasonal variations in the means of temperature differences at Itatuke and isawa with height, for USAF radiosonde observations compared with data compiled from charts awn from 9 land and 2 sea ship stations which use Japanese radiosondes. The height of the aximum difference varies with season and latitude and is higher in summer than in winter and in the uth than the north. *Subject Headings:* **1. Radiosonde comparisons 2. Japanese radiosonde USAF radiosonde 4. Haneda, Japan.**—*M.R.*

10L–401 551.508.822

Langlo, K., **International atmosphere at Payerne.** *World Meteorological Organization, WMO ulletin,* 5(3):104–106, July **1956.** photo. Also: Lugeon, Jean, **World comparison of radiosondes.** *id.,* 5(4):157–158, Oct. **1956.** photo. Also: Ashford, O. M., **World comparison of radiosondes.** *id.,* 6(1):21–23, Jan. **1957. DWB**—Langlo describes the meticulous arrangements made by Lugeon for the international comparisons at Payerne to begin on May 23, 1956. Belgium, France, ermany, India, Japan, Netherlands, Poland, Switzerland, U. K., U. S. and U.S.S.R. participated d experts from East Germany, Austria, Egypt and Yugoslavia attended. A new meteorograph for e in captive balloons up to 1 km was presented by Sweden and the balloon by France. Thirteen pes of radiosondes were compared. Weights range from 300 to 2200 grams, frequencies from 6–28 Mc/sec to 1680 Mc/sec, costs from 12–28 U. S. dollars, and equipment costs from $400–$2000, t counting wind equipment. Additional facts brought out by Lugeon are: 1) the statistical basis r comparison of 13 types during 13 ascents per day devised by A. Delver of the Netherlands; late arrival of a 14th type (Polish) which could not be encompassed by Delver's tests but which as attached to a Swiss radiosonde for reference and later sent up with the other 13; 3) 15 ballons uld carry 14 different radiosondes at once it was found, so some ascents were made this way; 370 radiosondes were launched at average cost of 800 SwFr each; 5) several reached 30 km but km was effective limit; 6) fixed height comparisons were made at 500 m above surface in daytime; at least 2 day and 2 night ascents were made every 24 hrs. Finally, in article by Ashford, the sults of the Working Group on Radiosonde Comparisons at Zürich on Oct. 22–26, 1956 are reported. he various types of radiosondes were compared statistically against the U. S. AN/AMT4 radiosonde, nce the latter showed the least random error. The German Graw H50 was found to have almost small a random error. The 6 additional studies of the data were made in the U.S.S.R., Belgium, inland, Japan, France and Holland. *Subject Headings:* **1. International radiosonde comparisons Payerne, Switzerland. I. Lugeon, Jean.**—*M.R.*

10L–402 551.508.822

Maenhout, A., **Vergelijking van radiosondes.** [Comparison of radiosondes.] *Hemel en ampkring,* The Hague, 53(7):143–144, July **1955.** fig.—A report on the comparison of radiosondes rried out at Evere, Belgium in 1954 by L. Malet in cooperation with the Belgian, Dutch, English, Vest German, U. S. government agencies. The radiosondes tested were the Kew MK2(England) endix and AMT 4 (U. S. A.) Graw H 50 (Germany), the Netherlands Philips. *Subject Headings:* **International radiosonde comparisons 2. Evere, Belgium.**—*I.L.D.*

10L–403 551.508.8

Satakopan, V. and Mull, S. (both, *Met. Office, New Delhi*), **An analysis of the radiosonde co parisons made at Payerne with 14 sondes in May–June 1956.** *Indian Journal of Meteorology & Geophysics*, Delhi, 8(4):367–378, Oct. **1957.** 10 tables, 6 refs. **DWB, DLC**—An exceedingly detai and varied statistical analysis of the results of the Payerne radiosonde comparisons of May–Ju 1956. The instruments were from Belgium (I. R. M.), West Germany (Graw H 50), E Germany (Lange), U. S. A. (AN/AMT), Finland (Väisälä), France (Metox), Japan (Code Typ India (Chronometric), U. K. (Kew MK II B), Netherlands (Philips), Switzerland (Chronometr U.S.S.R. (Molchanov RZ 049), India (Fan), and Poland (Lange modified). Standard residue er of observations, for day and night, pressure and temperature, standard error of difference betwe sonde means, correction for difference in levels, effect of level corrections on standard error, compa son of sonde means, and finally an assesment of the comparability of different sondes are discuss The U. S., U. K. and U.S.S.R. sondes show best comparability for pressure, and the Finnish, Japan and Indian for temperature. *Subject Headings:* **1. International radiosonde comparison 2. Payer Switzerland.**—*M.R.*

10L–404 551.508.8

Zaĭchikov, P. F., **Predvaritel'nye rezul'taty obrabotki materialov nabliueniĭ 2-go Mezhdu rodnogo sravneniia radiozondov.** [Preliminary results of the analysis of data from observatio during the second International Comparison of Radiosondes.] *Moscow. Tsentral'naia Aerol cheskaia Observatoriia, Trudy*, No. 22:51–59, **1957.** 8 tables, 8 eqs. **DWB**—During May and Ju 1956, comparisons were made in Payerne, Switzerland, of the different types of radiosondes used Belgium, the German Federal Republic, the German Democratic Republic, the U. S., Finla France, Japan, India, Great Britain, the Netherlands, Switzerland and the U.S.S.R. The accura of the radiosondes was determined by the method of triple control which enables an objective det mination of the random error of each type of radiosonde from the known errors of three pairs radiosondes consisting of three types in combinations of two. The principles and application of t method and the calculation of the reliability of the determined errors by determining the me square or the mean absolute differences of pairs of different types of instruments are outlined and t relevant formulas are presented. The accuracy of determining heights of isobaric surfaces and air temperatures aloft and the introduction of corrections for the effect of inertia and radiation w U.S.S.R. radiosonde data are discussed and numerical data on the comparative errors and t corrections are presented in tables. The systematic errors in the heights of isobaric surfaces by t U.S.S.R. radiosonde of type PZ-3049 can be eliminated almost entirely but random can be reduced the introduction of inertia and radiation corrections. The most accurate radiosondes are those the U. S. and of the German Federal Republic. *Subject Headings:* **1. International radioson comparisons 2. Payerne, Switzerland.**—*I.L.D.*

Radiation Errors

10L–405 551.508.8

Apps, R. F., **Results of experimental radiosonde ascents carried out during the partial so eclipse of June 20, 1955, at Hong Kong.** *Hong Kong. Royal Observatory, Technical Note*, No. March **1956.** 4 p. 3 figs., 2 tables, 4 refs. **DWB**—Three radiosonde ascents were made to t Scrase's (1953–1954) theory for calculating lag and radiation corrections to be used with the K Mk IIB radiosonde. One ascent reached top at time of maximum eclipse. Control ascents w made in full sunshine before and after eclipse. Descents were followed for 4 min after balloon bur Corrections made using Scrase's formulas are good for solar angles of 70°–80°, and radiation and correlation below 20 km at 8 m/sec ascent are almost the same as those given by Scrase. U corrected data, lag and radiation correlations are given in tables along with original Scrase compu tions and graphs of ascent temps. (both uncorrected and corrected) and wind vectors for all heigh *Subject Headings:* **1. Radiosonde corrections 2. Eclipse effects 3. Hong Kong 4. Kew Mk I radiosonde. I. Scrase, I. J.**—*M.R.*

10L–406 551.508.822:551.52

Canada. Meteorological Branch, **Solar radiation corrections in radiosonde temperatur Canadian type radiosonde instrument only.** Its *CIR*-2924, RAD-108, May **14, 1957.** 7 p. 2 tabl **DWB**—Operators of the Canadian type radiosondes are urged to apply solar radiosonde correcti to the temperatures of all daytime readings whenever the sun's elevation angle is greater than, equal to, 0°. An equally important adjustment is to be made for pressure levels which are betwe 400 mb and 10 mb. The author gives different examples and methods of computing these correctio *Subject Headings:* **1. Canadian radiosonde 2. Radiation errors of radiosondes.**—*N.N.*

10L–407 551.508.822

Cline, D. E., **Accuracy and cost reduction considerations in radiosonde.** *Weather Radar ference, Sept. 1955, Proceedings of the Fifth . . . Conference*, p. 79–87, pub. **1956.** 9 figs. **DWB**—is paper enumerates methods of improving the accuracy and thereby reducing the cost of balloon-ne radiosondes. Comparative data received from all radiosondes show great improvement in formance and the equipment now in use is very reliable. A table of theoretical radiosonde tem errors for temperature measurements in three ranges is included. *Subject Headings:* **1. Radio-de errors 2. Air-borne radiosondes.**—*N.N.*

10L–408 551.521.1:551.508.822

Duselevici, Iaroslav, **Influenţa radiaţiei solare asupra termometrelor bimetal de radiosondă.** nfluence of solar radiation upon the radiosonde bimetal thermometers.] *Meteorologia, Hidrologia Gospodărirea Apelor*, Bucharest, 3(1):74–76, **1958.** fig., 5 tables. **DWB**—In 1953, 27 comparative ndings were made at Bucharest Aerological Observatory, involving a) launching of two identical des in order to test the sensitivity of thermocouples, b) comparison of Molchanov 43 and 49 type liosondes, c) comparison of shielded and unshielded thermocouples and d) thermocouples covered h zinc oxide and with soot. Results of the comparisons are tabulated and shown graphically. *bject Heading:* **1. Solar radiation effects on radiosondes.**—*G.T.*

10L–409 551.508.822:551.515.4:551.524.7

McComb, Harold C. and Beebe, Robert G., **A thunderstorm sounding.** *Monthly Weather view*, Wash., D. C., 84(3):107, March **1956.** fig. **DWB, DLC**—A description and analysis of a cial RAOB made at Columbia, Mo., in connection with thunderstorms that occurred on Oct. 14, 54 over this region. The sound which is reproduced was marked by a lapse rate in the upper layer 3200 ft amounting to a decrease of 9°C potential temperature. It is suggested that this phe-nenon was real and not a result of instrumental error. *Subject Headings:* **1. Radiosonde observa-ns 2. Thunderstorm soundings 3. Lapse rates 4. Columbia, Mo.**—*I.L.D.*

10L–410 551.508.822

Malet, L. M., **Comparaison des radiosondes du type "Kew M.K.II" par la methode des elements neles.** [Comparison of radiosondes type "Kew M.K.II" by the method of parallel elements.] gium. *Institut Royal Météorologique, Publications*, No. 1, **1952.** 16 p. 5 tables, 2 figs. **DWB**—ultaneous ascents of two radiosondes for an error analysis were found to be inconvenient so that allel elements in the same radiosonde were adopted for this purpose. The standard deviation for ssure was about 7 mb practically constant for all heights; for temperature the value increased m 0.4 to 0.9°C at 100 mb and for relative humidity it varied between 2 and 8% with a maximum 700 mb. *Subject Headings:* **1. Radiosonde errors.**—*A.A.*

10L–411 551.508.822

Marfenko, O. V., **Sluchaĭnye oshibki radiozonda RZ-049.** [Random errors of the RZ-049.] oscow. *Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 22:35–39, **1957.** 5 tables, efs. **DWB**—In this experimental study of the random errors of radiosonde RZ-049, 35 pairs of liosondes operating on transmitters of different frequencies were compared. For each pair the ferences of their temperature, pressure and humidity at the same moment at given levels were termined. The random errors for temperature were greater during the day than at night; as gards absolute pressure the differences were approximately similar at all elevations although they re somewhat greater in the 850–500 mb layer; errors in humidity increased with height. In the lividual ascent the random errors were systematic. *Subject Heading:* **1. Radiosonde errors.** *I.L.D.*

10L–412 551.508.43:53.088.6 551.508.822

Peters, E., **Die Korrektion der Luftdruckmessung mit der Radiosonde Modell "Freiberg" nsichtlich der Temperaturempfindlichkeit des Aneroids.** [Correction of air pressure measure-nts with the Freiberg model radiosonde considering the temperature sensitivity of the aneroids.] *itschrift für Meteorologie*, Berlin, 12(1/2):32–34, Jan./Feb. **1958.** 2 figs., 5 refs., 7 eqs. **DWB, LC**—In the double pressure aneroid used in the Freiberg radiosonde model the elastic properties the material and the internal pressure are temperature dependent. The falsification of pressure curring during the ascent of the radiosonde into low temperatures is corrected by means of the rgesell-Kleinschmidt formula, namely $\Delta p = \Delta T \cdot \beta \cdot (p_k - p)$, where Δp = pressure correction; = difference between calibration and measured temperature; β = constant; p_k = compensation ssure, and p = actual pressure. By means of cold-warm calibrations of 50 aneroids the author amined the validity of this formula and calculated anew the values of β. The aneroids were asured between 1000 and 100 mb, every 100 mb. Every aneroid was calibrated at first under rm conditions, twice under cold and once again under warm conditions. The warm calibration

was at +20°C and the cold at −80°C. The compensation point, the intersection of the calibra curves, was computed. The computation of β is illustrated and a value of $\beta = 4.0 \times 10^{-4} \pm 0.4 \times$ degree C was obtained. The pressure change for aneroid rise is $\alpha = 3.4 \times 10^{2} \pm 0.2 \times 10^{2}$ mb/ *Subject Headings:* **1. Aneroid capsule errors 2. Pressure-height errors in radiosondes 3. Ra sonde temperature corrections.**—*I.L.D.*

10L–413 551.508.822:551.52

Petit, M. (*Etablissement d'Etudes de Recherches Met., Paris*), **La correction des sondage température: effect radioconvectif dans la radiosonde française.** [Correction of tempera soundings: radioconvective effect in the French radiosonde.] *Journal Scientifique de la Météorol* Paris, 5(20):146 155, Oct./Dec. **1953.** 6 tables, figs., 4 refs. **DWB**—The indirect heating occu in French radiosondes after the interposition of a sun screen is analyzed experimentally in ord obtain a correction factor. The convective effect is in the interior of the sunshade chimney. G the degree of heating of the wall it is possible to measure the resultant heating of the thermom The experimental determination of the variation of the heating of the wall for a given radiation function pressure temperature and ventilation during sounding is examined. Radio correction va are given in tables. *Subject Heading:* **1. Radiation errors of radiosondes.**—*I.L.D.*

10L–414 551.508.822:551.50

Petit, M. (*Etablissment d'Etudes et de Recherches Météorologiques, Paris*), **Isolement therm et barometrie en radiosondage.** [Thermal insulation and barometry in radio sounding.] *Jou Scientifique de la Météorologie*, Paris, 6(24):133–149, Oct./Dec. **1954.** table, 5 figs., 3 refs., French, English and Spanish summaries p. 133. **DWB**—Thermal insulation of the radiosondes in rawinsonde observations makes a great difference in the accuracy of the pressure readings accor to tests of heating and cooling the instruments. A temperature difference of only ±1°C has obtained in a sounding to 27 km height. New aneroid capsules with a thermal correction d allow even greater accuracy (error < ±0.5 mb). *Subject Headings:* **1. Radiosonde accuracy 2. T perature effects on radiosondes 3. Radiosonde aneroid barometers.**—*From author's abstract.*

10L–415 551.508.822:551.5

Polovina, I. P., **Tochnost' vychisleniia udel'noi vlazhnosti po dannym izmereniĭ otnosite vlazhnosti v svobodnoĭ atmosfere.** [Accuracy of specific humidity calculations from relative hu ity measurements in the free atmosphere.] *Moscow. Tsentral'naia Aerologicheskaia Observato Trudy*, No. 22:40–50, **1957.** 7 tables, 10 refs. **DWB**—Using 26 paired radiosonde ascents the au investigated the random errors and inertial errors of relative humidity measurements and effect upon the accuracy of computed specific humidity and compared the relative humidity valu the free atmosphere obtained by radiosonde and airplane ascents. The mean random erro relative humidity measurements in the lower troposphere were 2–6%; in specific humidity calculat they produce an error of ±0.05 g/kg in winter, ±0.02 g/kg in summer and ±0.019 g/kg in the t sitional seasons. The mean inertial errors are within the range of 1–6% in the lower troposphe June 2–6%, and in July 1–2%; they produce errors of ±0.1 g/kg in the specific humidity exce January when they amount to 0.05 g/kg. A comparison of mean specific humidities compute radiosonde and airplanes ascents indicates that the principal cause of the differences in the summ difference in temperature. *Subject Headings:* **1. Radiosonde humidity errors 2. Upper air humi** —*I.L.D.*

10L–416 551.508.822:53.0

Reshetov, V. D., **Obosnovanie metodiki vyderzhek radiozondov.** [The basis of the meth exposing radiosondes.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 16 **1956.** 5 refs., 4 tables, 3 figs. **DLC.** Transl. into English by Judith B. Danner, issued by Amer Meteorological Society under Contract AF 19(604)-1936, Oct. **1958.** 6 p. Complete.—Exp the reason for and practical methods of exposing radiosondes before their release into the atmosp in closed premises (for their calibration) and in the air (for establishing lease lines and adjustin instrument to free air temperature). *Subject Heading:* **1. Radiosonde calibration.**—*A.M.P.*

10L–417 551.508

Suzuki, S.; Shikano, I. and Nakamura, S., **Time lag of temperature inside the box in which aneroid is put.** *Tateno, Japan. Aerological Observatory, Journal*, 5(4):353–354, March fig., table, 2 eqs. In Japanese. English summary p. 353.—From results of 9 soundings mad the purpose of measuring the actual change of temperature of the box, in which the aneroid is put time lag coefficient of the box was calculated and an empirical formula to give the estimation o temperature of box from the air temperature observed was deduced. *Subject Heading:* **1. Radios errors.**—*Authors' abstract.*

10L–418 551.508.822:551.558

Zaĭchikov, P. F., **Tochnost' izmereniia skorosteĭ vertikal'nykh dvizheniĭ v svobodonoĭ atmosfere omoshch'iu grebenchatogo radiozonda i nekotorye voprosy metodiki izmereniĭ.** [Accuracy of asurements of the speed of vertical movements in the free atmosphere by means of the comb- mutator radiosonde and some problems of methodology.] *Moscow. Tsentral'naia Aerologi- iskaia Observatoriia, Trudy*, No. 22:65–72, **1957.** 2 figs., 2 tables, ref., 5 eqs. **DWB**—In the simpli- method of measuring vertical movement in the free atmosphere with a radiosonde introduced by F. Morozov, vertical velocities W were computed for layers between standard levels (earth— km, 0.5–1 km, etc.) the line of passage of the radiosonde through a layer had an accuracy of 0.1 instead of 0.05 min as in the previously used method. Hence the absolute vertical velocity had a ater error. The statistical analysis of the results of paired radiosonde ascents which is the funda- ntal method for determining the absolute (W_a) and relative (W_0) radiosonde velocities is presented l it is shown that the errors of absolute and relative velocity of ascent and independent of each er because W_0 obtained from the $W_0 = \Omega_\omega$ is determined by W_a since $\Omega = W_a/\omega = A + B(\rho_0/\rho)(1/\omega)$, ere Ω = pitch of the radiosonde. The determination of the coefficients A and B characterizing steering of the radiosonde platform is based on the assumption of the absence of a systematic tical wind component in the entire probed layer. The characteristic straight line of the radio- de platform is so constructed that in an individual layer the deviations of the vertical velocities m zero are a minimum. This brings about a scatter of A and B values for individual radiosondes. *bject Headings:* **1. Radiosonde errors 2. Vertical motion measurement.**—*I.L.D. and author's clusion.*

Radiosonde Instrumentation

10L–419 551.508.822

Konkurs na razrabotku novykh meteorologicheskikh priborov. [Competition on the develop- nt of new meteorological instruments.] *Meteorologiia i Gidrologiia*, No. 7:62–63, July **1956. WB,DLC.** Transl. into English available **DWB** (M08 C736co)—The Central Hydrometeorological ministration announced a contest for development of meteorological apparatus for measuring izontal visibility, atmospheric humidity and atmospheric humidity in radiosondes. The rules of contest, the judging and the specifications of the instruments are described. *Subject Headings:* **Radiosonde instruments 2. U.S.S.R.**—*I.L.D.*

10L–420 551.508.822

Mészáros, Ernő, **Néhány általános megjegyés a rádiószondák nyomásés hőmérsékleteleménék életesítéséről.** [General remarks on the improvement of the pressure and temperature elements radiosondes.] *Időjárás*, Budapest, 62(3):176–177, May/June **1958. DLC**—Various methods of nperature compensation for radiosonde barometers and radiation compensation for temperature ments are described, especially the new water moderated Finnish radiosonde barometer (U. Rossi, 6) and the use of thermistors for temperature measurement on radiosondes. *Subject Headings:* **Radiosonde elements 2. Radiosonde thermistors.**—*G.T.*

10L–421 551.508.822:551.508.43

Shionomisaki, Japan. Weather Station. Aerological Observation Section, **An experiment on strain of sonde aneroid barometer.** *Journal of Meteorological Research*, Tokyo, 10(1):70–72, 58. 2 figs., table, ref. In Japanese. **DWB, DLC**—A study of residual effect (strain) period of panese made L and M type transmitters of a radiosonde aneroid barometer was made in 1953. perimental method and statistical data treatment are briefly discussed. Tabulations of arithmetic an, standard deviation and population mean of barometic pressure data ranging from 40–950 mb the periods of 1, 3, 6, 9 hrs and 1, 3, 6, 9, 12 days, and graphs of population means of the L and M e are given. Definite residual effect (strain) periods were not determined in the experiment, but it ms that a period of 6 hrs for L type and 9 hrs for M type are required to get accurate data after cking the instruments. *Subject Heading:* **1. Radiosonde aneroid barometers.**—*J. Woo.*

10L–422 551.508.822

Shtein, N. I., **Raschet peredatchikov sverkhvysokikh chastot, ispol'zuemykh v radiozondakh.** alculation of ultra high-frequency transmitters used in radiosondes.] Leningrad. *Nauchno- ledovatel'skii Institut Gidrometeorologicheskogo Priborostroeniia, Trudy*, No. 5: 107–120, **1957.** gs., 5 refs., 44 eqs. **DLC, DWB**—The author examines the problems associated with calculation, ing telegraphy, of the electrical regime of two types of high frequency generators containing illating contours with (1) concentrated constants and (2) distributed constants, since these are only instances when it is impossible to take into account the inertia of electrons. The required its of regulation of individual parameters of the autogenerator are discussed. The limits of

application of the method of computing autogenerators in the high frequency range are present and the method of determining the required value of the coefficient of inverse association and t choice of angle of incidence of the anode current are presented. *Subject Heading:* **1. Radioson transmitters.**—*I.L.D.*

10L–423 551.508.822:621.373:621.3

Shtein, N. I., **Sootnoshenie mezhdu dlitel'nost'iu radioimpul'sa i dlitel'nost'iu modu ruiushchego impul'sa v lampovykh avtogeneratorakh.** [Interrelation between the duration of radio impulse and that of a modulating impulse in oscillator tubes.] *Leningrad. Nauchno-Issled vatel'skiĭ Institut Gidrometeorologicheskogo Priborostroeniia, Trudy*, No. 5:138–144, 1957. tabl 4 refs., eqs. **DWB, DLC**—The author analyzes the dependence of the length of a bending rad impulse upon the length of a wave of autooscillation and the initial conditions of self excitation for given length of a modulatory impulse. Equations are developed for determining the time of esta lishment of a bending radioimpulse and the numerical value of the ion in length of a bending rad impulse in comparison with the length of the modulating impulse. Data are presented showing th with shortening of the length of the wave of autooscillation and diminution of the quality of t oscillating system of the self generator τ_{est} and τ_l decrease (τ_{est} = time of establishment of oscillatio τ_l = loss of length of impulse). In the meter range τ_{est} and τ_l have magnitudes of the order of fra tions or units of measurements; in the centimeter range τ_{est} and τ_l are small so that they can neglected in the calculation of oscillator tubes only if the given length of the bending radiosonde τl greater than τ_{est}. The value τ_l is taken into account only when it is commensurate with the leng of the bending radiosonde. *Subject Headings:* **1. Radiosonde transmitters 2. Oscillator tube —***I.L.D.*

Special Types of Radiosondes

10L–424 551.508.822(02)(7

Canada. Meteorological Branch, **The Canadian radiosonde and rawinsonde system.** I *CIR*-2877, INS-80, Manual 91, Feb. 13, **1957.** Each section repaged. figs. **DWB, DLC**—T complete manual for radiosonde packaging, shipment, storage, preparation for flight, baseline pr cedure, repair, calibration, forms, auxiliary equipment, operation of receiver and records, ar computation of records. Parts are described and illustrated by sketches. The Candian meteor graph is a motor meteorograph using the basic Olland principle. *Subject Headings:* **1. Radiosond manuals 2. Canadian radiosonde 3. Canada.**—*M.R.*

10L–425 551.508.822:551.508.25:511.521.1

Newman, John B., **An infrared radiosonde.** Johns Hopkins Univ. Lab. of Astrophysics an Physical Meteorology, Contract AF 19(604)949, Scientific Report No. 1, Aug. 15, **1956.** 28 13 figs. (incl. photos), 12 refs., 5 eqs.—The design and performance of an infrared radiosonde for t 15μ carbon dioxide band is described. Two units have been built and flown. No data were obtaine from the first owing to damage in launching. Qualitative data were obtained from the second ov a limited path, which indicate that the equipment can be made to perform reliably. The infrare system consists of wide aperture optics, a reflection filter (residual rays of magnesium oxide), a interference transmission filter (multilayers of tellurium and rock salt), a thermistor bolometer an associated electronics. A dc signal is generated from the chopped incoming radiation which contro the modulation rate of the telemetering transmitter. Internal calibration is provided by blackenin the detector side of the chopper blade; data on the chopper temperature throughout the flight ar obtained from a regular radiosonde thermistor. An ordinary radiosonde provides humidity, tem perature and pressure data on a time sharing telemetering system. The radiosonde circuits have bee modified to allow modulation by both a voltage change (the dc signal from the infrared system i the place of humidity data) and a resistance change (temperature). The infrared apparatus and th modified radiosonde (telemetering at 403 Mc) make up the complete unit. It weighs about 15 lb with batteries and can be flown to 100,000 ft on a 7000 gm meteorological type balloon. The groun link of the telemetering system can be any regular weather sounding station with a 403 Mc antenn and receiver. The current design is for the downward radiation in this CO_2 band. With the presen electronic filter components (time constant of 1.2 sec), the unit has a dc signal to noise of 50 for night sky signal; this is roughly equivalent to that obtained by the system from a chopper at 220° looking at a source at 0°K. *Subject Heading:* **1. Infrared radiosondes.**—*Author's abstract.*

10L–426 551.508.822:551.574

Klinkow, W., **Über Vereisungsmessungen mit der Radiosonde "Modell Lang."** [Icing mea urements with the LANG radiosonde.] *Zeitschrift für Meteorologie*, Berlin, 10(4):121–125, Apr **1956.** 3 figs., 2 tables, 11 refs. **DLC**—Icing of registering and radiosonde balloons has been reporte

but in addition, icing of the bimetallic temperature element of the Lang radiosonde is suspected. Ascents at Berlin with American type *r/s* show temperatures around 500 mb different from those with the Lang instrument at Greifswald, Dresden and Wernigerode. *Subject Headings:* **1. Icing of radiosondes 2. Radiosonde observations.**—*C.E.P.B.*

10L–427 551.508.822

Schultz, K., **Die "Philips-Radiosonde," ein Messaparat für meteorologische Beobachtungen.** [The Philips-radiosonde, an instrument for measuring meteorological observations.] *Schweizerische Technische Zeitschrift*, Berne, 54(52):1102–1104, Dec. 26, 1957. 4 figs. **DLC**—A technical description of the Philips radiosonde. *Subject Heading:* **1. Philips radiosonde.**—*A.V.*

10L–428 551.508.822:551.594.21

Arabadzhi, V. I., **Ob izmerenii napriazhennosti elektricheskogo polia v grozovykh oblakakh s pomoshch'iu radiozonda.** [Measurements of electric field intensity in thunderclouds by means of a radiosonde.] *Akademiia Nauk SSSR, Doklady*, 111(1):85–88, **1956.** 3 figs., 3 refs. **DLC** (AS262. S3663) Eng. transl. available Associated Technical Service, P. O. Box 271, E. Orange, N. J., as its ATS-93K20R—Radiosonde equipment designed for field intensity measurement in thunderclouds is described and illustrated. The detailed description includes the measuring and receiving units, transmission and recording of signals, calibration, etc. Records obtained in a frontal and convective thunderstorm are presented (Minsk, July and Aug. 1955), and they show that the zone of separation between opposite charges in thunderclouds is between the 0°–10° isotherms. The highest field intensity recorded was 200 v/cm. *Subject Headings:* **1. Thunderstorm electric field measurement 2. Radiosonde electric field measurement.**—*G.T.*

10L–429 551.508.822

Akimov, M. N., **Ob izmenenii grebenki davleniia radiozonda s tsel'iu uvelicheniia potolka zondirovaniia.** [Modification of the pressure comb of the radiosonde for the purpose of raising the sounding ceiling.] *Meteorologiia i Gidrologiia*, Leningrad, No. 2:46, **1958.** 1 ref. **DWB, DLC**—The distribution of teeth in the pressure comb of the radiosonde at the present time reduces the results of soundings. The errors in pressure soundings of the upper levels of the atmosphere, especially 20–25 km are indicated. It is suggested that by lengthening slightly the pressure comb, for example by 1/3, it would be possible to increase the number of teeth and place them in such a way that the difference between the heights corresponding to two adjoining teeth, would not exceed 3 km. *Subject Heading:* **1. Comb radiosonde construction.**—*I.L.D.*

10L–430 551 508.822:621.318.1

Nepomniashchiĭ, S. I., **Grebenchatyĭ radiozonde s elektrodvigatelem.** [Comb radiosonde with an electric motor.] *Meteorologiia i Gidrologiia, Leningrad*, No. 6: 47–49, June **1958.** 3 figs. (incl. photos). **DWB, DLC**—The author describes the construction of an electric motor for rotating the commutator of a comb radiosonde. This motor is inexpensive, of small weight and dimensions, requires little current and is very reliable at low temperatures (negative). The motor is illustrated by means of a diagram and photographs, the latter showing radiosonde with installed motor. The motor consists of a stator, which is at the same time the core of an electromagnet and which consists of two separated parts united in the groove of the electromagnet coil. The installation of the motor in the comb radiosonde and its operation when in use are described. *Subject Headings:* **1. Comb radiosondes 2. Electromagnets.**—*I.L.D.*

10L–431 551.508.822:551.507.352

Nepomniashchiĭ, S. I., **Samoletnyĭ abrasyvaemyi radiozond'.** [A radiosonde which is dropped from an airplane.] *Leningrad Nauchno-Issledovatel'skiĭ Institut Gidrometeorologicheskogo Priborostroeniia, Trudy*, No. 5:17–40, **1957.** 10 figs., 5 refs., 15 eqs. **DLC, DWB**—The author describes the construction, properties and operation of an airplane radiosonde developed in the Scientific Institute of Hydrometeorological Instrument Construction and which constitutes an aerological device dropped by parachute and used only once. It is capable of measuring pressure, temperature and atmospheric humidity up to heights of 15,000 m. It consists of a cylindrical container, instruments, power unit and parachute with a distance opening mechanism. Measurements are transmitted in the form of radio telegraphy signals. With the aid of photographs, diagrams and relevant formulas the author describes the construction and principles of operation of the radiosonde. *Subject Headings:* **1. Radiosondes dropped from airplanes 2. Radiosonde operator.**—*I.L.D.*

10L–432 551.508.822

†Tommila, Mauri, **A variable-radio-frequency radiosonde system with graphical transfer of the recording to the aerological diagram.** *Finland. Ilmatieteellinen Keskuslaitos, Toimituksia*, No. 39,

1956. 56 p. 27 figs., 30 refs., 18 eqs. **DWB, DLC**—The author has been engaged in developme and application of the Finnish radiosonde since 1934. Historical comments are given. An improv radiosonde is described in detail. Greater accuracy and faster computation of sounding results w the primary objectives. A temperature message can be ready within 5–10 min after the hoist the balloon, employing a graphical transfer of recorded points. One number on the recording pa corresponds to about 0.4C and 4 sub. cylindrical capacitors are used to ensure a linear scale. T main advantages of the old Finnish radiosonde are maintained. *Subject Headings:* **1. Radioson recorders 2. Väisälä radiosonde.**—*A.A.*

10L–433 551.508.8

Väisälä, Vilho, **A method for the direct recording of sounding data on aerological diagram pape a preliminary report.** *Helsinki. Universitet. Meteorologiska Institutet, Mitteilungen, Ser.* 6(2), **1957.** 6 p. 2 figs., table. **DWB, DLC**—An experimental "transformer" is described a illustrated for use in direct evaluation of Finnish radiosonde records. The device is quite elabora so as to keep up with the balloon during ascent (it can be turned with a motor, or by hand). Settin can be made to speed up or reduce rate of turning. The end result is a direct plot of temperatur humidity and pressure on an adiabatic chart, making use of the calibration charts and the reco received by radio A comparative table for a flight on April 24, 1956 shows remarkable agreeme between conventional method and the mechanical transcriber. Mean difference was −0.3 m −0.33°C for 75 T points between 800 and 30 mb. *Subject Headings:* **1. Radiosonde recorde 2. Adiabatic chart preparation 3. Väisälä radiosonde evaluation.**—*M.R.*

Rawin and Rawinsondes

10L–434 551.508.57:551.508.822:551.524

De, A. C. (*Met. Office, Calcutta*), **A high altitude radiosonde ascent at Dum Dum.** *India Journal of Meteorology and Geophysics*, Delhi, 9(3):293, July **1958.** fig. **DWB, DLC**—This is brief report on the attempts made during the IGY to make radiosonde-cum-rawin ascents as hig as possible. A temperature-altitude curve for the radiosonde ascent at Dum Dum was made o July 6, 1957 at 0530 IST. The normal temperature distribution over the place in July and the wind obtained from the rawin ascent of that day of investigation are shown graphically. *Subject Heading* **1. High altitude radiosonde flights 2. Rawin ascents 3. Dum Dum Airport, India,**—*N.N.*

10L–435 551.508.822:551.508.5

Ramachandran, S. (*Met. Office, Poona*), **A technique employing frequency shift keying (FSK method for tracking F-type rawinsondes.** *Indian Journal of Meteorology and Geophysics*, Ne Delhi, 9(1):63–66, Jan. **1958.** 4 figs., ref., 10 eqs. **DWB, DLC**—This paper described a method producing a frequency shift keying transmitter and the method of adapting it for use with the F-typ rawinsonde. The frequency shift keying is produced by a short copper strip placed at a distance two in. from the transmitter. The rawinsonde thus developed retains the essential simplicity the single valve transmitter. Its special feature is the steady signal for direction finding, providin at the same time, the F-type radiosonde signals which are translated into the records on the pape tape as usual. *Subject Heading:* **1. Rawinsonde tracking.**—*Author's abstract.*

10L–436 551.508.57:551.508.82

Singer, Bernard M. (*Geophysics Research Directorate*), **Rawinsonde measurements.** (In Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first mile.** N. Y. Pergamo Press, **1957.** Vol. 1:293–295. table, 4 refs., 4 eqs.) **DWB**—The computational procedure fo each rawin run made at O'Neill is outlined and the errors in velocities computed from rawin data a analyzed. Equations are presented giving the standard wind vector due to the error in incrementa altitude caused by an incremental and absolute pressure, the standard wind vector error due to th error in incremental elevation angle and the standard wind error due to error in incremental azimut angle. *Subject Headings:* **1. Rawin errors 2. O'Neill, Nebr.**—*I.L.D.*

10L–437 551.508.82

U. S. Air Force. Cambridge Research Center, **ARDC interim test report (component) b Atmospheric Devices Laboratory of Geophysics Research Directorate.** Oct. 1, **1957.** 16 p. graph **DWB** (M08.822 U581ar)—Parts of the rawin set AN/GMD-2 were tested and test procedures an results are described in this document. The components tested (the radiosonde AN/AMQ-9 an some other components were not included in this test) are found to be functionally suitable; chang aimed at their improvement are suggested. *Subject Headings:* **1. Rawin tests 2. Rawinsond improvements.**—*G.T.*

10L–438 551.508.822

U. S. Weather Bureau, **Notes on Rawin Set AN/GMD-1A(1) for electronics technicians.** Dec. 10, **1953.** 38 p. 39 figs. **DWB**—Systematic and detailed instructions for use by electronics technicians in servicing AN/6MD-1 and -1A rawin sets used by U. S. W. B. Instructions concern type of current, frequency, range weight, receiving system, drive motors, tachometer generators, position indicator, control recorder, numbering system for parts, antenna system, housing, elevation unit, angle recorder and R. F. system. Many graphic illustrations and line drawings are included. *Subject Headings:* **1. Rawin servicing instructions 2. Rawin manuals.**—*M.R.*

10L–439 551.508.57:551.508.822

Peterson, Arnold C. (*U. S. Army Signal Engineering Labs., Fort Monmouth, N. J.*), **Performance of remitter-type rawinsonde system (rawin set AN/GMD-2).** Fort Monmouth, N. J., U. S. Army Signal Engineering Labs., [**1956**] 8 p. +2 photos. Mimeo. **DWB** (M08.822 P485pe)—The rawinsonde system, rawin set AN/GMD-2, is described in this paper as a system using a highly accurate direction finder (rawin set AN/GMD-1) a slant measuring device, an automatic meteorological data computer and a semiautomatic wind computer for the measurement of the slant range to a balloon-borne radiosonde. This solves the problem of large wind errors at the lower angles. The system is used in conjunction with radiosonde set AN/AMQ-9. The assembled equipment is illustrated. *Subject Headings:* **1. Rawinsondes 2. Radiosondes.**—*N.N.*

WIRE-TRANSMITTING METEOROGRAPHS (551.508.823)

10L–440 551.508.823

Gersht, E. P., **Prioritet russikikh uchenykh v sozdanii telemeteorografov.** [The priority of Russian scientists in creation of telemeteorographs.] *Meteorologiia i Gidrologiia*, No. 2:51, March/April, **1955. DWB**–The construction of the first telemeteorograph is attributed to D. P. Ezuchevskiĭ. A sketch and an account of its construction and operation are presented in the proceedings of the twelfth session of the Section on Physical Sciences of the Society of Natural Sciences and Ethnography, Feb. 2, 1874. *Subject Heading:* **1. Telemeteorographs.**—*I.L.D.*

10L–441 551.508.823 551.508.77

Tsukamoto, K.; Takahashi, K. and Naito, K. (*Met. Res. Inst.*), **On direct reading indicator and recorder of instant intensity.** *Papers in Meteorology and Geophysics*, Tokyo, 5(3/4):263–265, Jan. **1955.** 5 figs., 2 tables, 2 eqs. **DWB**—An ingenious device is described and illustrated which will enable any contact recording mechanism (such as an anemometer or tipping bucket rain gage) to be converted into an intensity recording device. It operates on the analogy of $v = s/t$ (where v = wind speed, s = distance wind blows for each contact, and t the time interval between contacts) and the well-known $I = E/R$. Thus if the resistance R can be made to correspond to the time t between contacts, the current I will be proportional to v. A clock mechanism or a synchronous motor, a rotary switch and adjusting resistor are the added equipment needed to do the trick. Wiring diagram and examples of records (wind and rain) are presented along with schematic drawings of the equipment. *Subject Headings:* **1. Direct reading intensity recorders 2. Wind speed recorders 3. Rainfall intensity recorders.**—*M.R.*

AUTOMATIC STATIONS (551.508.824)

10L–442 551.508.824

Bartnicki, L., **Automatyczne stacje meteorologiczne.** [Automatic meteorological stations.] *Przegląd Meteorologiczny i Hydrologiczny*, Warsaw, 7(1/2):71–73, **1954. DWB, DLC**—The need of furnishing the airlines with weather information over unpopulated areas and the impossibility of manning such remote meteorological stations with suitable personnel, led to the idea of constructing automatic meteorological stations, recording weather observations and transmitting them by means of radio transmitters. The first implementation of this idea took place in the U.S.S.R. where 25 automatic meteorological stations were established by 1945. Some of them worked automatically on accumulators (without need of loading the batteries) during a whole yr, were built in remote parts of the Arctic and worked successfully in spite of varying weather conditions. In this paper, the author describes the construction and operation of a French automatic meteorological station intended for the Sahara which would relay actual values of pressure, temperature, humidity, direction and speed of wind and precipitation amounts, to a distance of 1500 km. The information was obtained from the first issue of *La Météorologie* for 1949 and was also published in the Oct. 1953 issue of the *World Meteorological Organization, WMO Bulletin* (*see* 5.10–83, Oct. 1954, *MAB*). *Subject Headings:* **1. Automatic weather stations 2. France.**—*A.M.P.*

10L–443 551.508.824:551.508.77:621.316.9

Blomgren, Walter, E. (*Bur. of Reclamation, Denver*), **Messtationen für Niederschläge mi Radiomeldung.** [Radio reporting precipitation network.] *Schweizerische Bauzeitung*, Zurich 73(21):320. May 21, **1950.** 2 figs. **DLC**—A network of six radio reporting precipitation gage has been set up by the Bureau of Reclamation in the Central Valley of Calif. The stations an their distance from Bass, the central collecting station on Lake Shasta at the head of the Sacra mento Valley, are shown on chart. A photograph of the huge radio precipitation gage is also in cluded. The network is part of the Central Valley Network and the U. S. W. B.-Corps of Engineer network for Calif. The equipment was developed by electronics engineers of the Bureau of Reclama tion in Denver. *Subject Headings:* **1. Radio reporting precipitation networks 2. Precipitation gage 3. Sacramento Valley, Calif.**—*M.R.*

10L–444 551.508.82

Ostrowiński, H., **Odległośsiowa stacje meteorologiczna.** [Remote recording meteorologica stations.] *Przeglad Meteorologiczny i Hydrologiczny*, Warsaw, 7(1/2):73–77, **1954.** ref. **DWB DLC**—A remote station enabling one to utilize serial instruments, as used in meteorological networks for the measurement of basic elements, as air temperature (from +40 to −40°C), relative humidit (from 20–100%), velocity of wind, was constructed by A. N. Mat'sev and gave good results in th U.S.S.R. during 4 yrs of experiments. The nonelectrical meteorological values taken down by th individual receivers of the measured elements are replaced by electronic tubes and relayed to a central receiver. Depending on the value of the meteorological parameters there takes place a potentiometric distribution of constant current prevailing at the ends of the rheostat. The voltage released by the potentiometer is then forwarded by wire to the central indicator (index pin) located in the observers' room. After discussing the working principle of the installation the author takes up and describes the individual parts of the stations, the electrical wiring and the central indicator. Photos of the individual parts and a graph showing the electrical circuits are included. *Subject Headings:* **1. Automatic weather stations 2. Remote recording equipment 3. U.S.S.R.**—*A.M.P.*

10L–445 551.508.824

Rogers, P., **United States automatic weather stations.** *World Meteorological Organization WMO Bulletin*, 6(2):70–72, April **1957.** 2 photos. **DWB**—A summary of information furnished by the U. S. Weather Bureau to WMO Secretariat, describing and illustrating the automatic weather stations of 2 types which have been designed in the U. S. The newest (U. S. W. B.) type is known as the automatic teletypewriter weather observer, which observes visibility, temp. and dew point, wind direction and speed, pressure and precip., cloud heights and weather type may eventually be included. It converts Morse code signals automatically into teletypewriter code. Four of these stations are in use and 15 more are being installed. The U. S. National Bureau of Standards has developed a marine station that operates for 6 months on a buoy. It has a radio range of >800 mi. *Subject Headings:* **1. Automatic weather stations 2. Automatic teletype weather observer 3. Automatic marine weather stations.**—*M.R.*

10L–446 551.508.824:551.577.2:551.501.9

Sanuki, M., **Japanese automatic rainfall stations.** *World Meteorological Organization, WMO Bulletin*, 5(3):112–113, July **1956.** 2 photos. **DWB**—A brief report, with transmitting station (at 1936 m on a hilltop) and transmitting station equipment illustrated, giving some of the details of the program involving 109 automatic rainfall transmitting and 70 receiving stations, operating from spring until late autumn in Japan for the flood warning service. Hourly reports are transmitted on 414 Mc/s (0.3 w output) by Morse code signals. The equipment consists of 7 units, the 14 cm rain gage, the metering, coding, programming, transmitting, power and receiver units. *Subject Headings:* **1. Automatic rainfall stations 2. Rain gage networks 3. Japan.**—*M.R.*

10L–447 551.508.824:551.577.37

Sanuki, M.; Okada, G.; Mizuno, N. et al. (*all, Japan Met. Agency, Met. Instrument Plant, J.M.A., and Met. Research Institute*), **Automatic weather station for rainfall.** *Geophysical Magazine*, Tokyo, 27(3):375–386, Sept. **1956.** 2 figs., 6 photos, 2 refs. **DWB, DLC**—Development of automatic weather stations for rainfall for immediate and prompt information by UHF transmission is described. They are now widely used for heavy rainfall warning in Japan, and amount to 109 transmitting stations in total (status in January 1956). Instrumentation, operation and maintenance operation and maintenance problems are also discussed. *Subject Headings:* **1. Automatic rainfall stations 2. Heavy rainfall forecasting 3. Japan.**—*Authors' abstract.*

10L–448 551.508.824:551.515.2

von Wald, W. A., Jr. (*U. W. Naval Res. Lab., Wash., D. C.*), **Drifting-buoy-type automatic weather stations.** *National Research Council, Wash., D. C., Publication*, No. 473:145–146, **1957.**

DWB (551.46 N277 pr), **DLC** (GC57.N33, 1956)—In this report the use of drifting buoys for hurricane reconnaissance, as well as their importance in meteorological single station techniques, is given. *Subject Headings:* **1. Automatic weather stations 2. Drifting buoys for hurricane reconnaissance 3. Hurricane reconnaissance.**—*N.N.*

10L–449 551.508.824

†Woelfle, F., **Automatische Wetterstationen.** [Automatic weather stations.] *Meteorologische Rundschau*, Berlin, 11(2):60–67, March/April **1958.** 5 figs., 3 tables, 60 refs. **DWB, DLC.** Review by Rudolf Czelnai in *Időjárás*, 62(3):174, May/June **1958.**—The general principles underlying the construction of automatic weather stations including the necessary characteristics of the individual elements are described in detail. With the aid of diagrams a description is given of the sensing elements; the transformers into electrical impulses of the values measured by the sensing elements; the recording apparatus, coding, program direction and control of the operation; the weather station, and the transmission of the information. Detailed descriptions are also given of a recording automatic weather station; climatic automatic stations, including temperature, humidity wind velocity and directions, precipitation, sunshine duration, recording apparatus, program control; a reporting automatic station (synoptic automatic station), and a ground radiosonde. *Subject Heading:* **1. Automatic weather stations.**—*I.L.D.*

RADAR EQUIPMENT FOR DETECTING METEOROLOGICAL PHENOMENA (551.508.85)

10L–450 551.508.85

Pineo, V. C. and Gautier, T. N., **The wave-frequency dependence of the duration of radar-type echoes from meteor trails.** *Science*, 114(2966):460–462, Nov. 2, **1951.** graphs, refs. **DLC**—Reference is made to a conclusion reached by A. C. B. Lovell, that the duration of meteor echoes is approximately proportional to the square of the wave length. Evidence to the same effect is presented in this report, based on simultaneous measurements of duration at 27.2 Mc and 41.0 Mc, conducted by the Central Radio Propagation Laboratory of the National Bureau of Standards at the NBS radio field station at Sterling, Va. A graph representing a juxtaposition of duration at the two frequencies and another showing ratio of durations as a function of angle of incidence, are presented. *Subject Headings:* **1. Radar echoes from meteor trails 2. Meteor echo duration. I. Lovell, A. C. B. II. U. S. National Bureau of Standards. Central Radio Propagation Laboratory.** —*G.T.*

10L–451 551.508.85:621.396.812.8

Martin, Roy A. (*Ga. Inst. of Tech.*), **Radio equipment for microwave propagation studies at wave lengths of 3, 10 and 23 centimeters.** Georgia Institute of Technology. State Engineering Experiment Station, Contract W28-099-ac-175, May 10, **1950.** Technical Report No. 2, 42 p. 25 figs., foot-refs. **DWB**—Descriptive text accompanies the many illustrations and block diagrams outlining the stationary and the mobile equipment employed in the microwave propagation measurements over land paths at Georgia Institute of Technology. *Subject Headings:* **1. Microwave propagation 2. Radio equipment.**—*W.N.*

10L–452 551.508.85:551.596:621.396.8

Troude, J., **L'élimination du bruit de fond et des interférences en radar.** [The elimination of ground noise and interference in radar.] *Electronique, Télécommunications, Electricité* (*Revue H F*) Brussels, 4(2):25–31, **1958.** 5 figs. **DLC**—The author examines first the fundamental peculiarities of ground noise in radar, and then extends the notion of ground noise to every kind of interference of whatsoever a character. Afterwards, he throws into relief the characteristics peculiar to the serviceable echoes, which allow their differentiation from the ground noise, and describes the functioning principle of an apparatus designed to eliminate the ground noise. An example of industrial application is given: this device, built by the Compagnie Générale-TSF, Paris, uses a memory tube, the functioning of which is explained. An apparatus of this type is in use in Belgium at the Melsbroeck airport, and also at the radar station connected with the "Régie des Voies Aériennes." *Subject Headings:* **1. Radar noise 2. Meteorological noise 3. National Airport, Brussels.**—*A.V.*

SFERICS EQUIPMENT (551.508.86)

10L–453 551.508.86:621.396.812

Iwai, Akira and Sugiyama, Yukihiro, **Delay line for measuring the waveform at atmospherics.** *Nagoya. Univ. Research Institute of Atmospherics, Proceedings*, 6:56–62, Jan. **1959.** 9 figs., table. **DWB**—Several trials have been made to obtain a suitable delay line for measuring the wave form

of atmospherics, but sufficient characteristics have not been obtained. Recently, a supersonic delay line was manufactured in Japan. An excellent result which had not been attained is now possible by using this supersonic delay line. The delay time obtained at present is 250 microseconds, but the value of 500-600 microseconds is reached without any trouble. *Subject Headings:* **1. Sferics 2. Wave form measurement techniques 3. Supersonic delay line 4. Japan.**—*Authors' summary.*

10L-454 551.508.86:551.594.22

Stergis, C. G. (*Geophysics Res. Directorate, Air F. Cambridge Res. Ctr.*), and Doyle, J. W. (*Melpar, Inc.*), **Location of near lightning discharges.** *Conference on Atmospheric Electricity, 2nd, Portsmouth, N. H., May 1958, Proceedings*, issued **1958.** p. 589-597. 7 figs., 2 tables, 5 refs. **DWB** (M(055) C748pr)—A sferics system for detecting the direction of arrival of electromagnetic energy from lightning discharges within a radius of 100 mi was developed. It consists essentially of two crossed Adcock antennas of the elevated or H-type which are rotatable for ease of electrical balancing. The outputs of the antennas go to identical amplifiers and then to the plates of an oscilloscope which is intensity modulated. Field tests at 100 kc and 1.5 Mc indicate that the system can be made to have an accuracy of better than 2° in azimuth angle determination. *Subject Headings:* **1. Sferics equipment 2. Lightning detectors.**—*Authors' abstract.*

INSTRUMENTS FOR MEASURING NUCLEI OR IMPURITIES (551.508.91)

Atmospheric Pollution Measurement Instruments

10L-455 551.508.91

†Adams, D. F.; Dana, H. J. and Koppe, R. K., **"Universal" air pollutant analyzer (U.S.P.H.S. Contract No. 66512), prepared for the Community Air Pollution Program, Robert A. Taft Sanitary Engineering Center, Cincinnati, Ohio by the Institute of Technology, State College of Washington, Pullman.** Cincinnati, Ohio, Issued by Taft Sanitary Engineering Center, Sept. 4, **1957.** 20 p. 14 figs. (incl. photos), 26 refs.—Two prototype automatic atmospheric pollutant analyzers suitable for producing dosimeter or continuously integrated records have been designed and constructed. The zirconium-eriochrome cyanine R reagent for fluoride and the starch-iodine blue reagent for sulfur dioxide have been modified for use in the analyzers. The reduced stability of these reagents under continuous air aeration for periods exceeding 4–12 hrs limits the pollutant concentration which may be accumulated by a single reagent charge. This appears, however, to be desirable from the viewpoint of field application. The instrument has been field tested for three weeks in the vicinity of Mead, Wash. and Waneta, B. C. Simultaneous comparisons were made between the Thomas autometer, titrilog and the dosimeter for sulfur diozide and an automatic scrubbing solution collector and the dosimeter for hydrogen fluoride. The instrument shows greater sensitivity to these two pollutants than other instrumental methods commercially available. *Subject Headings:* **1. Atmospheric pollution measurement instruments 2. Air sampling and analysis techniques.**—*Authors' abstract.*

10L-456 551.508.91

Brunetti, Cledo, Magill, P. L. and Sawer, F. G. (*Stanford Res. Inst., Stanford, Calif.*), **New developments in instrumentation for air pollution studies.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air pollution: proceedings,** pub. **1952.** p. 643–655. 13 figs., 9 refs.) **DLC** (TD887.U5)—Description of operating principles, diagrams and photographs of instruments for counting solid and liquid particles, such as the portable electrostatic precipitator designed at the Stanford Research Institute, Sonkin cascade impactor, thermal precipitator, the modified Venturi scrubber. The analyses of collected material, optical and photographic measurements of particles are discussed. The apparatus for collection and determination of gases such as ammonia, sulfur dioxide, nitrogen oxides is described and its use is illustrated. Proper sampling procedures for determining nature and degree of atmospheric pollution are outlined briefly. *Subject Headings:* **1. Cascade impactors 2. Electrostatic precipitators 3. Air sampling and analysis techniques 4. Atmospheric pollution measurement instruments.**—*I.L.D.*

10L-457 551.508.91

Dvorak, R. V. and Chase, R. L., **An air-borne densitometer for smoke concentration measurements.** *U. S. Atomic Energy Commission, AECU-1582,* Oct. **9, 1951.** 7 p. 4 figs., 4 refs. **DWB** (M08.91 D988ai)—A simple, light weight, split beam optical smoke densitometer is described. The instrument is sufficiently light (4.25 lbs) and rugged to be carried aloft by a captive balloon for the measurement of atmospheric smoke, stack effluent dilution, etc. Concentrations of oil fog aerosols as low as .92 mg/m^3 have been measured. *Subject Headings:* **1. Air-borne smoke densitometers 2. Atmospheric pollution measurement instruments.**—*Authors' abstract.*

10L–458 551.508.91

Gordon, Mendel T. and Orr, Clyde, Jr. (*both, Georgia Institute of Technology*), **Thermal precipitation in air pollution studies.** *Air Repair*, Pittsburgh, Pa., 4(1):1–4, 39, May **1954.** 5 figs., 2 refs., eqs. **DWB**—A number of types of aerosol counters which make use of the thermal repulsion principle from AITKEN (1884) to date, are described and illustrated. The sampler developed in the micromeritics and bioengineering laboratories at Georgia Institute of Technology's Engineering Experiment Station, which was used for precipitating bacteria and other organic matter in air, and can be used for all types of aerosols, is given detailed treatment. A nomogram shows the terminal settling velocity of water drops in gravitational and thermal field for particles of 0.01μ–8.0μ diameter. The device can also be used for sampling radioactive air-borne wastes. *Subject Headings:* **1. Aerosol counters 2. Thermal precipitation of dust 3. Radioactive waste sampling. I. Aitken, John.**—*M.R.*

10L–459 551.508.91:621.38

Lieberman, A.; Radner, S. et al. (*all, Illinois Inst. of Technology, Chicago*), **Some particle counts in the Chicago atmosphere.** *Air Pollution Control Association, Proceedings*, Vol. 50, 1957. Issued **1958?** Paper No. 23 [5 p.]. 12 figs., 2 tables, 4 refs. **DWB** (M10.42 A298ap)—The studies further indicate that the electronic particle counter provides a ready means for obtaining considerable data in a short time with extremely limited personnel and effort. It may be noted, in passing, that hundreds of size and concentration readings were obtained and processed in a matter of days, a task that would have required as many months had we been restricted to the use of such techniques as impingement and microscopic evaluation. *Subject Headings:* **1. Particle counters 2. Atmospheric pollution 3. Chicago, Ill. I. Fochtman, E.**—*Authors' summary.*

10L–460 551.508.91

Parker, A. and Richards, S. H. (*Dept. of Scientific and Indust. Res., London*), **Instruments used for the measurement of atmospheric pollution in Great Britain.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air pollution: proceedings,** pub. **1952.** p. 531–546. 6 figs., table, 9 refs.) **DLC**—A review of the development of methods for measuring atmospheric pollution and of their standardization. The methods and apparatus described are the deposit gage which measures and samples accurately the total material deposited during one month in the locality in which it is exposed; the surveys of deposited matter by exposing petri dishes for periods of 24 or 48 hrs; the measurement of suspended particles by drawing a measured volume of air through white filter paper such as the Owens automatic filter; measurement of sulfur dioxide, and instruments for sampling and examination of suspended matter, for studying the number and size distribution of air pollutants. The various apparatus are illustrated with photographs and diagrams, their operation is described and their usefulness and limitations are considered in detail with various atmospheric conditions, sampling errors, etc. *Subject Heading:* **1. Atmospheric pollution measurement instruments.**—*I.L.D.*

10L–461 551.508.91

Silverman, Leslie (*Harvard School of Public Health, Harvard Univ., Boston, Mass.*), **Characteristics of filter beds for aerosols.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air pollution: proceedings,** pub. **1952.** p. 289–301. 7 figs., 2 tables, refs., 7 eqs.) **DLC** (TD887.U5)—A detailed description of the characteristics of various types of filter beds utilized for air and gas cleaning. There are static filter beds, dynamic and aggregate beds. Their theory, operation and application for removing atmospheric and household dusts and industrial atmospheric contaminants such as those of the sulfuric acid industry, and the effects of aerosols upon filter bed performance are discussed. *Subject Headings:* **1. Aerosol filters 2. Industrial waste gases 3. Atmospheric pollution.**—*I.L.D.*

CLOUD CHAMBERS

10L–462 551.508.91(09)

Barron, S. L., **C. T. R. Wilson and the cloud chamber.** London, Cambridge Scientific Instrument Co., Ltd., **1952.** 15 p. 19 figs., photo.—WILSON first produced clouds by expansion in a closed chamber in 1895. Diagrams are given of early experimental models (1895–6), photographs and descriptions of types from 1910–1952. Alpha, beta and X-ray tracks are reproduced. *Subject Headings:* **1. Cloud chambers 2. Condensation nuclei 3. Wilson, C. T. R.**—*C.E.P.B.*

10L–463 551.508.91

Bownes, C. and Cusack, N. (*Univ. of London*), **Diffusion cloud-chamber.** *Discovery*, London, 15(9):362–365, Sept. **1954.** 5 figs., 5 refs. **DLC**—The original expansion type cloud chamber (Wilson's) is described and illustrated and the more recent diffusion type treated in greater detail.

The fact that the older expansion cloud chambers did not allow continuous observation and operation whereas the diffusion type, though just as simple and cheap to construct and operate, does allow such operation, makes the latter type more valuable in cosmic ray as well as other types of fast particle research. *Subject Headings:* **1. Diffusion cloud chambers 2. Cloud chambers.**—*M.R.*

10L–464 551.508.91

Burhop, E. H. S., **Cloud chamber and associated techniques.** *Nature*, London, 175(4463):832–833, May 14, **1955. DWB**—Summary of a conference in University College, London, March 24–26, 1955, attended by over 120 physicists. The quick recovery of the cloud chamber is an advantage but the shallowness and indefiniteness of the sensitive area are disadvantages. The multiplate chamber, techniques for control of cloud chambers, high pressure chambers, the bubble chamber and the interpretation of cloud chamber photographs were also discussed. *Subject Heading:* **1. Cloud chambers.**—*C.E.P.B.*

10L–465 551.508.91

Elliot, John B.; Maenchen, George; Moulthrop, Peter H. et al. (*Radiation Lab., Dept. of Physics, Univ. of Calif.*), **Thirty-six-atmosphere diffusion cloud chamber.** *Review of Scientific Instruments*, N. Y., 26(7):696–697, July **1955.** fig., numerous refs. **DWB, DLC**—A 35-atmosphere diffusion cloud chamber has been constructed for use with the 184-in. cyclotron and with the bevatron. Minimum-ionizing particles leave dense, sharp tracks of good contrast with hydrogen filling at design pressure. In the operation described, one event is obtained every 15 min for a reaction cross section of 30 mb for negative pions on hydrogen. Among the unique features of the chamber are (a) the high pressure; (b) the high magnetic field; (c) the simple unit preassembly of the chamber and the upper pole piece; (d) the distortion free photography afforded by the small camera windows of good optical quality directly in front of the camera lenses and the absence of a large top glass near the sensitive region; (e) the thin window for collimated beams; (f) the supported cast Astrolite windows for illumination; and (g) the satisfactory sensitive layer obtained despite the large height-diameter ratio of the pressure vessel. *Subject Headings:* **1. Cloud chambers. I. Oswald, Larry O. II. Powell, Wilson M. III. Wright, Robert W.**—*Authors' abstract.*

10L–466 551.508.91:551.574.1

Georgii, H. W., **Eine neue Mischwolkenkammer für wolkenphysikalische Untersuchungen.** [New cloud mixing chamber for cloud physics research.] *Frankfurt a.M. Universitat. Meteorologisch-Geophysikalisches Institut, Bericht*, No. 6:25–30, **1956.** fig., 6 refs. **DWB**—In order to investigate the dependence of ice nuclei upon temperature in a cold chamber, a special cloud mixing chamber was developed. In this chamber (the construction of which is based upon the work of V. SCHAEFER) a column of air determined by the size of the chamber is cooled at a given rate by means of a cold bath. Since a temperature inversion is established in the upper part of the chamber, conditions resembling those prevailing in a stratiform cloud are established. A diagram of the cold chamber built in the Frankfurt Meteorological Institute is presented and its construction and operation are described in detail. *Subject Headings:* **1. Cloud physics research 2. Cloud chambers 3. Frankfurt Meteorological Institute, Germany.**—*I.L.D.*

10L–467 551.508.91

Meyer, Bernhard, **Untersuchungen an Blitzlampen zur Beleuchtung von Wilson-Kammern.** [Investigation of flash lamps for illuminating Wilson chambers.] *Zeitschrift für Angewandte Physik*, 5(4):139–142, **1953.** 5 figs., 28 refs.—A setup is described using energies up to 5000 w/s and 30 KV. The illumination was measured photographically with a grey wedge. *Subject Heading:* **1. Cloud chambers.**—*C.E.P.B.*

10L–468 551.508.91

Pickroth, G. and Spitzenberg, F., **Ultraschallvernebelung: ein neuer Weg zur Erzeugung von Aerosolen.** [Ultrasonic fogging: a new way of generating aerosols.] *Naturwissenschaften*, 41(9):209, May **1954. DWB**—A high frequency generator and sound box with resonator were used at Jena to form clouds of droplets of nearly uniform size. *Subject Heading:* **1. Cloud chambers.**—*C.E.P.B.*

10L–469 551.508.91:551.574.1

Podzimek, J., **Die Ergebnisse der ersten Kondensationsversuche in der Unterdruckapparatur.** [Results of the first condensation experiment in the low pressure chamber.] *Geofisica Pura e Applicata*, Milan, 36:76–85, Jan./April **1957.** 5 figs., table, 7 refs. **DLC**—A description is presented of the newly adapted Findeisen low pressure cloud chamber and of the first measurements made to determine the influence of temperature and expansion rate on the start and duration of fog. The

lations obtained are explained by physical and chemical properties of condensation nuclei and of eir surfaces. A deviation from the obtained dependence of the start of fog on air temperature, upersaturation and expansion rate is explained by means of the simplified Findeisen formula for omputing maximal supersaturation in water clouds. An attempt is made to calculate the radii f droplets from colored rings brought about by diffraction of light on fog droplets. *Subject Headings:* **Findeisen low pressure cloud chamber 2. Fog formation 3. Condensation nuclei.**—*Author's bstract.*

10L–470 551.508.91

Riezler, W. and Werz, R., **Über eine einfache kontinuerliche Nebelkammer.** [On a simple ontinuous cloud chamber.] *Naturwissenschaften*, 40(4):138–139, Feb. **1953.** 3 figs., 9 refs. **DWB**—A new diffusion chamber is described and illustrated. It worked equally well for α, β and roton, Röntgen and γ rays. Specimen traces are reproduced. Illumination is sufficient for filming aces; UV radiation below 4100 Å is cut out, otherwise a dense fog of fine drops is produced in 10 sec. *ubject Heading:* **1. Cloud chambers.**—*C.E.P.B.*

10L–471 551.508.91

Saunders, Bernard G. (*Oak Ridge National Lab., Oak Ridge, Tennessee*), **Cloud chamber for ounting nuclei in aerosols.** *Review of Scientific Instruments*, N. Y., 27(5):273–277, May **1956.** figs., 13 refs. Also issued as: *U. S. Atomic Energy Commission*, [*Report*] *ORNL*-1957, Oct. 27, **955.** 29 p. 9 figs., 5 refs., eqs. **DWB**—A cloud chamber is described which measures either the bsolute or relative concentration of nuclei in an aerosol. Water droplets are condensed on aerosol articles in a small sample, and the resulting water droplets are photographed on 16-mm film by ashtube illumination and then counted in a microprint reader. Two types of expansion cloud cham- ers were found to work satisfactorily: the volume defined and the pressure defined. The apparatus s completely automatic and will operate continuously on a 1-min cycle. It can measure aerosol oncentrations that range from 200 particles/cm^3–2 $\times 10^6$ particles/cm^3. *Subject Heading:* **1. Cloud hambers.**—*Author's abstract.*

10L–472 551.508.91:551.576:536.421

Serpolay, R., **Une chambre à nuage pour étudier l'activité glaçogène des aérosols.** [Cloud hamber for the study of ice forming activity of aerosols.] *Puy de Dôme. Observatoire, Bulletin*, Jo. 4:97–107, Oct./Dec. **1955.** 3 figs., 11 refs. **DWB**—A cloud chamber 56 $\times$28 $\times$42 cm for study- ng the ice nucleation processes of AgI, $AgNO_3$, PbI_2 is described and illustrated and results obtained ith the 3 nucleating agents summarized. The first crystals of ice in a supercooled cloud polluted ith AgI (regardless of method of production of vapor) were at $-4.0° \pm 0.3°$C, and of $AgNO_3$ at $-5.8° \pm 0.3°$C. PbI_2 produced by vaporizing charcoal impregnated with NaI or KI did not give unique temperature for ice crystal formation, but the range was between $-13.4°$ and $-6.5°$C epending on process of vaporization. *Subject Headings:* **1. Cloud chambers 2. Artificial nucleation 3. Supercooled clouds.**—*M.R.*

Dust Counters And Samplers

10L–473 551.508.91:551.510.42

Casella, C. F. & Co., Ltd., London, **Jet dust counter for airborne particles.** Its *Leaflet* No. 722, n.d. [3 p.] 2 illus. **DWB**—A simple apparatus for quick collection of dust samples is described nd illustrated. Its purpose is to serve as an easy means of obtaining data for estimating the con- entration of solid particles at various points in a mine, plant, etc. A stream of air is taken in by a ump through a cylinder placed at a right angle with the pump. When the stream changes its irection the particles carried by it continue their original course and are deposited on a collecting late in the base of the cylinder. *Subject Heading:* **1. Dust sampling instruments.**—*G.T.*

10L–474 551.508.91:551.510.42

Casella, C. F. & Co., Ltd., London, **Settlement dust counter.** Its *Leaflet* No. 778, n.d. [3 p.] llus. **DWB**—Dust particles of air-borne bacteria settle down on a Canada-balsam-floated glass late from the definite volume of air enclosed in the settlement dust counter. Up to six cover glasses an be exposed successively and the grading achieved by them indicates the different terminal elocities of particles of the original dust. The instrument is described briefly and illustrated. *Subject Heading:* **1. Dust counters.**—*G.T.*

10L–475 551.508.91:551.510.42

Casella, C. F. & Co., Ltd., London, **Thermal precipitator.** Its *Leaflet* No. 720 A., n.d. [7 p.] illus., 3 refs. **DWB**—A dust and smoke sampler for use in mines, plants, etc. is described and

shown in photographs. Its operation is based on the fact that dust particles cannot pass throu an area heated by a thin wire. When an air current is drawn through that area the particles carri by it are deposited on glass plates on both sides of the wire. The instrument's efficiency is claim to be the highest of any known sampler. Particles of the size of 0.16μ–5μ are deposited with accuracy approaching 100% and the accuracy for particles up to 10μ and down to well below t optical visibility limit is not much lower. *Subject Headings:* **1. Dust sampling instruments 2. The mal precipitators.**—*G.T.*

10L–476 551.508.91:551.510.

Charmbury, H. B. (*Penna. St. Col.*), **The use and limitations of the midget impinger for du evaluation.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air pollutio proceedings,** pub. **1952.** p. 184–192. 5 figs., refs.) **DLC** (TD887.U5)—The midget imping method of GREENBERG-SMITH for the collection and analysis of dust, provides information only the amount of solids suspended in air expressed in terms of millions of particles per cubic ft. T apparatus is described with the aid of a diagram and the procedure is outlined. The various limit tions of the method are considered in detail. The method is empirical, giving only relative result Limitations that influence its use and application include the ability of the apparatus to draw du into the nozzle tube, the loss of collecting fluid by evaporation, shattering of the dust as a result impingement, the stability of the dust in the liquid, the size range of the dust and the settling tim before counting. *Subject Headings:* **1. Dust counters 2. Air sampling and analysis instrument** —*I.L.D.*

10L–477 551.508.91 551.510.4

Fisher, A. F. (*School of Hygiene, Univ. of Toronto*), **Dustfall measurements.** *Air Pollutio Control Association, Pittsburgh, Journal,* 7(1):47–50, May **1957.** 4 figs., 4 tables, 3 foot-refs. **DWI DLC**—Data obtained simultaneously with 4 different types of dustfall basins (shown in diagram are presented. Values measured by two different gages differ as much as up to 100%. *Subje Headings:* **1. Dust fall measurement techniques 2. Dust fall data.**—*G.T.*

10L–478 551.508.9

Goodale, T. C.; Carder, B. M. and Evans, E. C., **Dust particles in high velocity air streams** *American Industrial Hygiene Association Quarterly,* 13(4):226–231, Dec. **1952.** 10 figs., 11 eq **DLC**—Problems of sampling dust particles in flight arise from turbulence or aerodynamic actio (a) around the plane and (b) around the orifice of the sampler itself, while traveling at high speed The acceleration of light dust particles will be at right angles to the air stream when the streamline are curved, so these particles will be deficient in the sample. Heavier particles may not be so easil deflected and hence more representative. An isokinetic sampler for aerosols has been developed t overcome these difficulties, at a variety of air speeds and pressures (heights). The inlet is vane always to point into the airflow. The particles are precipitated aerostatically on glass slides, electro microscope screens and metal surfaces. Theory and examples of statistical distribution and numer ous photos of parts are included in paper. *Subject Heading:* **1. Dust sampling instruments.**—*M.R*

10L–479 551.508.91:551.510.41

Laskin, Sidney (*Univ. of Rochester, Rochester, N. Y.*), **The modified cascade impactor.** (In U. S. Technical Conference on Air Pollution, Wash. D. C., 1950, **Air pollution: proceedings,** pub **1952.** p. 656–671. figs., refs.) **DLC** (TD887.U5)—A discussion of the results of studies with a modified form of cascade impactor and of the methods developed in conjunction with these studies Photographs of the apparatus are presented and the method of calibration is discussed. *Subjec Headings:* **1. Cascade impactors 2. Air sampling and analysis instruments.**—*I.L.D.*

10L–480 551.508.91:551.510.41:551.510.7

Legrand, J. P.; Meunier, R. et al., **Etude de la composition des poussières météoritiques** [Study of the composition of meteoritic dust.] *L'Astronomie,* Paris, 72(2):75–79, Feb. **1958** fig., 3 tables, 8 refs. **DLC**—Study of meteoritic particles in dust. Particles were collected in the region of Paris. The study of the external aspect and the chemical analysis of dust are insufficient methods. The author analyzes the meteoritic dust by the "activation" method, and natural radio activity measurement of this dust was made by means of a Geiger counter. *Subject Headings.* **1. Meteoritic particles 2. Radioactivity in the atmosphere 3. Air sampling and analysis techniques I. Bonpas, M.**—*A.V.*

10L–481 551.508.91:551.510.42

Litvinov, V. F. and Litvinova, N. N. (*Rostov/Don Univ.*), **Elektrofil'tr dlia polucheniia prob atmosfernoĭ pyli.** [Electrofilter for obtaining samples of atmospheric dust.] *Gigiena i Sanitariia,*

Moscow, No. 9:16–18, Sept. **1955.** 4 figs., 3 refs. **DLC**—A description with the aid of photographs of an electric filter for sampling atmospheric dust in small concentrations which is characterized by lighter weight, and since it does not need a transformer guard and a high voltage line, it can be used in field work. Two models differing in their current supply, namely, ac from a municipal electric system and from storage batteries are described. *Subject Headings:* **1. Air sampling and analysis instruments 2. Dust sampling instruments.**—*I.L.D.*

10L–482 551.508.91

Lodge, James P. and Fanzoi, Hanny M. (*both, Dept. of Met., Univ. of Chicago*), **Extension of the gelatin method for the detection of micron-sized particles.** *Analytical Chemistry*, Wash., D. C., 26(11):1829, Nov. **1954.** 2 refs. **DLC**—The details of application of the gelatin technique for detection of calcium, sulfate and nitrate ions in spot tests of microscopic particles in the air are given in condensed form. *Subject Headings:* **1. Particle detection methods 2. Air sampling and analysis techniques.**—*M.R.*

10L–483 551.508.91:551.510.42

Nader, John S. (*Robert Taft Eng. Center, Cinn., Ohio*), **Dust retention efficiencies of dustfall collectors.** *Air Pollution Control Association, Proceedings*, Vol. 50, **1957.** Issued **1958?** Paper No. 22. [5 p.] 4 figs., 4 tables. **DWB** (M10.42 A298ap)—Dustfall collectors representing three collection techniques were exposed to atmospheric dustfall under weather conditions typical of a temperate climate. A statistical evaluation of the gravimetric analysis data and the dust retention efficiencies shows no significant differences among the three types of collections. *Subject Heading:* **1. Dust collecting instruments.**—*Author's summary.*

10L–484 551.508.91 551.510.42

Roach, S. A. (*Pneumoconiosis Research Unit (Cardiff), Llandough Hospital, Penarth, Glamorgan*), **Counting error due to overlapping particles in thermal precipitator samples.** *Nature*, London, 181(4628):134, July 12, **1958.** 2 figs., 3 refs. **DWB**—A preliminary report is given on the methods of determining the counting error due to overlapping particles in thermal precipitator samples of dust clouds. The mean projected area of the particles under study was 18.6μ^2 and two thermal precipitators were used. The results showed that with sampling densities of 25–50 particles per 20-μ traverse, the true dust concentrations of the coal dust cloud are between 5 and 15% higher than those estimated from the counts. A full report on this is expected soon. *Subject Headings:* **1. Dust content of air 2. Dust counting techniques.**—*N.N.*

10L–485 551.508.91:551.510.42

Whitby, K. T.; Algren, A. B. et al. (*all, Univ. Minnesota*), **The ASHAE air-borne dust survey.** *Air Pollution Control Association, Proceedings*, Vol. 50, **1957.** Issued **1958?** Paper No. 5 (10 p.). 9 tables, 6 refs. **DWB** (M10.42 A298ap). Also issued in: *Air Pollution Control Association, Journal*, 7(3):157–165, Nov. **1957.** 9 figs. (incl. photos), 6 tables, 6 refs., eqs. **DLC, DWB.** Also in: *American Society of Heating and Air conditioning Engineers, Transactions*, 64:129–150, **1958.** 9 figs. (incl. photos), 6 tables, 6 refs., 4 eqs. **DWB, DLC**—Given below are the important conclusions from this survey and from the analysis of work by other investigators. It should be emphasized that to a certain extent, results are dependent on the analysis methods used. (1) The differences in particle character and concentration between clean nonindustrial cities such as Minneapolis and polluted industrial cities are much greater than the differences in size distribution. (2) The variations in normal air-borne dust are large enough to make it suitable as a test dust only for rough performance testing of air cleaners. (3) For Minneapolis, summer dust is significantly finer, lighter colored, of lower concentration and less bimodal in size distribution than dust during the rest of the year. This may be attributed to a reduction in the carbonaceous and fly ash particles during the summer. (4) The large differences in the amount of fibrous particles found in different locations may have very significant effects on the operation of air cleaners. This conclusion is being substantiated by current research on filter life. Miscellaneous conclusions are: (1) In normal airborne dust most staining is done by particles less than 5μ in size. (2) Most airborne dust aggregates are tightly bonded together and require severe mechanical dispersion to break them up. (3) Natural air-borne dust particles collected in bulk suffer irreversible agglomeration due to polymerization of compounds in the dust. (4) The millipore filter sampling and sedimentation weight concentration and size analysis technique is convenient, rapid and flexible. It appears to be well suited to general purpose air-borne dust evaluation. *Subject Headings:* **1. Dust sampling techniques 2. Air-borne dust surveys 3. Air sampling and analysis instruments. I. Jordan, R. D. II. Annis, J. C.**—*Authors' conclusions.*

Ion Counters

10L–486 551.508.91:551.510.7

Courtier, G. B., **Determination of radon and thoron in air.** *Nature*, London, 180(4582):382–383, Aug. 24, **1957.** eqs. **DWB**—A favored method for determination of radon is filtration of about 1 m^3 of air and detection of activity found on the filter in a particle counter or ionization chamber. The equations for radium A, B, C, and C^1 are given. Similar expressions can be formulated for thoron. *Subject Headings:* **1. Radon content of atmosphere 2. Thoron content of atmosphere 3. Radioactivity in the atmosphere measurement techniques.**—*C.E.P.B.*

10L–487 551.508.91:551.508.95

Gillespie, T. and Langstroth, G. O., **An instrument for determining the electric charge distribution in aerosols.** *Canada. Suffield Experimental Station, Ralston, Alberta, Suffield Technical Paper*, No. 12, Feb. 14, **1952.** 9 p. 8 figs., 2 tables, 10 refs. **DWB** (M(055) C212s)—The instrument described in this report has been developed to provide a means of measuring the electric charges on a relatively large number of particles during a comparatively short period in the history of an aerosol. These novel characteristics have been obtained by depositing a sample on microscope slides in such a way that the charge on any particle at deposition can be determined in a subsequent examination from the size of the particle and its position on the slide. There is evidence to show that the act of sampling with this instrument does not cause spurious charging of particles. The construction and theory of the instrument are described in some detail, and results of tests are given to show that the theory is applicable. The use of the instrument is illustrated by an account of a preliminary study of the charge distribution in a silica dust aerosol at various times after generation. *Subject Headings:* **1. Electrical charges on aerosols 2. Aerosol electricity measurement instruments.**—*Authors' abstract.*

Particle Size Determination and Distribution

10L–488 551.508.91:551.510.422

Cassel, Hans M. and Schultz, Harold (*Bureau of Mines, Pittsburgh*), **A sonic method of determining particle size in aerosols.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air pollution: proceedings,** pub. **1952.** p. 634–642. 4 figs., 3 tables, 9 refs., 7 eqs.) **DLC** (TD887.U5)—The size of particles in aerosols is determined "by subjecting suspended particles to sonic vibrations and determining the particle dimensions from measurement of the resultant amplitudes." The author discusses the theoretical bases of the procedure which depends primarily upon the application of Stokes' law to the oscillating motion of small particles, the accuracy of measurement of amplitudes, an abbreviated procedure for analyzing particle size distribution and sources of error in measurement; namely, limitations of illumination, shape factor, particle collision effects of overtones. Experimental results involving the acoustic method against microscopic measurements are presented. *Subject Heading:* **1. Particle size determination techniques.**—*I.L.D.*

10L–489 551.508.91

Goetz, Alexander (*Calif. Inst. of Tech.*), **An instrument for the quantitative separation and size-classification of air-borne particulate matter down to 0.2 micron.** *Geofisica Pura e Applicata*, Milan, 36:49–69, Jan./April **1957.** 11 figs., 6 refs., 14 eqs. **DLC**—The theory and experimental design of an instrument for the quantitative separation and size classification of air-borne particulate matter down to diameter of 2.10^{-5} cm and its performance characteristics are described. The basic operating principle of the instrument consists of exerting a high centrifugal acceleration (ca. 20,000 g) on a continuous laminar flow of the aerosol, so that the trajectories of the air-borne particles (nuclei) in the flow follow Stokes' law, and the locus of their deposition becomes predictable. This principle is realized by a rotor, driven electrically at ca. 400 Hertz, which carries a helical channel the peripheral wall of which forms the removable envelope of a cone, and thus the place of particle deposition. The movement of the air relative to the channel is caused by the impeller-action (viscous drag) of the rotating helix. The relative flow velocity is kept in the laminar range (Reynold's number ≤ 800) by control of the flow resistance of the channel. The resulting particle deposit is arranged in accordance with the equivalent of the "Stokes diameters," hence counts and chemical analyses of individual size classes are possible, solely with reference to the locus of deposition on the channel wall. Examples taken from city air and automobile exhausts are briefly discussed. *Subject Heading:* **1. Particle size determination instruments.**—*Author's abstract.*

10L–490 551.508.91:551.574.2:551.509.617

Krasikov, P. N. and Mamontov, N. V., **Opredelenie razmerov chastits, isomorfnykh l'du primeniaemykh pri opytakh fazovogo prevrashcheniia vody.** [Determination of the size of particles,

omorphous with ice, used in experiments on the phase transition of water.] *Leningrad. Glavnaia eofizicheskaia Observatoriia, Trudy*, No. 67(129):144–153, **1957.** 9 figs., 6 tables, 11 refs. **DWB**—n order to obtain AgI and PbI smoke the reagents were evaporated in a carbon electric arc, or vaporated by means of an electric spiral placed within a large bottle, or birch charcoal containing hese substances was burned. The dimensions of the particles were determined by an electronic nicroscope of the 50 kw magnetic microscope type. The method of preparing the specimens for bservation under the microscope, in particular the special plates for holding the specimens, is escribed. Numerical data are presented on the size distribution of AgI obtained by the spark of an lectric arc by an electric spiral and by the burning of charcoal, and on the size distribution of PbI btained by burning charcoal and pulverization in a vacuum. It is seen that 80–90% of the AgI nd PbI have dimensions in the range of 1×10^{-6} to 8×10^{-6} cm. No evidence of crystalline shapes as apparent. *Subject Headings:* **1. Particle size determination techniques 2. Electron microscope nalysis 3. Silver iodide nuclei 4. Lead iodide nuclei.**—*I.L.D.*

10L–491 551.508.91 551.510.42(47)

Laktionov, A. G., **Raspredelenie chastits aerozolia v scobodnoĭ atmosfere.** [Distribution of erosol particles in the free atmosphere.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 3:419–21, March **1958.** 3 figs., 7 refs., eqs. **DWB, DLC**—The author presents the results of the first measurements of aerosol particles and their dimensions in the free atmosphere over various physical geographic regions of the U.S.S.R. along the line Moscow-Leningrad-Kiev-Krasnodar-Bakoc-Tashkent and conversely. In addition to measurements made during flights, atmospheric soundings were made from 100–5000 m during time of maximum and minimum atmospheric mixing. Measurements were made by means of a special photoelectric device which recorded and measured the particles automatically. The optical system of the apparatus is described with the aid of a diagram, and graphs showing the relationship between concentration of particles and height in the free atmosphere are presented. The concentration of particles $r>4\mu$ depends upon physical geographic characteristics of a region. The results of numerous studies on the concentration of particles with height in clear weather indicate that the particles are distributed in the atmosphere in layers. On the assumption that the concentration of particles $r>4\mu$ can be expressed in the form $N_r>r_0=\text{const}/r_0^k$, it is possible to find the index k, namely $N_r>r_1/N_r>r_2=(r_2/r_1)^k$. *Subject Headings:* **1. Particle size determination 2. Particle size distribution 3. U.S.S.R.**—*I.L.D.*

10L–492 551.508.91

La Mer, Victor K. (*Columbia University, N. Y.*), **The production and measurement of the particle radius of very fine monodisperse sulfuric acid aerosols.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air pollution: proceedings,** pub. **1952.** p. 167–168.) **DLC**—The abstract and conclusions of a report that appeared in the *Journal of Colloid Chemistry*, Aug., **1950** under the joint authorship of Victor E. LaMer, Edward Inn and Irvin Wilson. The method developed for measuring particle size consists in growing quantitatively very small aerosol droplets to a size range where they can be measured by established optical methods. For a size range terminating at the approximate lower limit of 0.08μ radius, the polarization of scattered light provides the most sensitive measure. The homogeneous aerosol generators of LaMer and Sinclair can be used to produce exceedingly small particles such as 99% H_2SO_4 and dibutyl phthalate. *Subject Headings:* **1. Particle size determination techniques 2. LaMer-Sinclair aerosol generator.**—*I.L.D.*

10L–493 551.508.91

La Mer, Victor K. (*Columbia Univ., New York*), **The preparation, collection, and measurement of aerosols.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air pollution: proceedings,** pub. **1952.** p. 607–616. 5 figs., refs.) **DLC** (TD887.U5)—The preparation of monodisperse aerosols, (that is aerosols in which the size distribution does not deviate by more than 10% from the mean value) is described with the aid of a diagram of a monodisperse aerosol generator made of pyrex glass. The optical properties of monodisperse aerosols as determined on the basis of Rayleigh's and Mie's theories of a method based upon the Higher Order Tyndall Spectra, and by transmission methods of optical obscuration by monodisperse fogs, and the forward angle Tyndallometer are analyzed. The rates of condensation and evaporation, the thermal repulsion of aerosol particles, and the use of the cascade impactor for rapid determination of particle size distribution upon successive slides are discussed. *Subject Headings:* **1. Aerosols 2. Particle size distribution.**—*I.L.D.*

10L–494 551.508.91

Yoshikawa, Herbert H.; Swartz, George A.; MacWaters, John T. and Fite, Wade L. (*all, Inst. for Cooperative Res., Univ. of Pennsylvania*), **Electrostatic particle size analyzer.** *Review of Scientific Instruments*, N. Y., 27(6):359–362, June **1956.** 5 figs., 5 eqs. **DLC, DWB**—This paper comprises the theoretical analysis and physical description of an electrostatic particle size analyzer (EPSA)

for determining the particle size distribution of aerosols in the 1- to 20-μ size range. Included a photographs and histograms illustrating the size separation attained and also a histogram of th particle size distribution in the general aerosol as determined by use of the instrument. *Subje Heading:* **1. Particle size distribution instruments.**—*Authors' abstract.*

Photoelectric Nuclei Counters

10L–495 551.508.91:551.507.352 551.574

Day, G. J. (*Great Britain Meteorological Office*), **Some airborne observations of condensatic nucleus concentration, Pt. 1, Variations in the vertical.** *Great Britain. Meteorological Researc Committee, M.R.P.* No. 1069, Sept. 2, **1957.** 7 p. 3 figs., 4 tables, 18 refs. **DWB** (M(055) G786m —Methods are discussed by which condensation nucleus concentration is customarily measured an attention drawn to the defects of these methods. An account is given of the Pollak photoelectri condensation nucleus counter and of its use in a Hastings aircraft of the Meteorological Researc Flight in the investigation of the distribution in the vertical of condensation nuclei with radii greate than about 10^{-6} cm. Over Southern England nucleus concentration attained a maximum value o 5000 cm^{-3} at 2000 ft and 500 cm^{-3} at 10,000 ft. Over calm sea 1500 cm^{-3} was observed at 400 f and 100 cm^{-3} at 5000 ft. Over violently disturbed sea 10,000 cm^{-3} was observed up to 2000 ft In general the vertical stability of the air mass had a considerable influence on the local condensatio nucleus population. (For an earlier report on the same subject, *see* 7.8–80, Aug. 1956, *MAB.* *Subject Headings:* **1. Condensation nuclei counters 2. Condensation nuclei vertical distributio 3. Southern England.**—*From author's abstract.*

10L–496 551.508.9

Liebermann, W. and Hofmeister, F., **Status Report No. 1. on North American Instruments, Inc. Contract NSF-C41. June 15, 1957.** 5 p. 11 figs. (incl. photos). **DWB** (M08.768 N864s)—Reflected light pulses from ice nuclei (crystals) can be used to count the number, size and time required fo formation of active freezing nuclei in an air sample. A photomultiplier tube is used to convert the output for the counter. Ice crystals of 20 to 100μ can be definitely counted at 100,000 pulses per sec if necessary but at first, 20,000 pulses per sec is the capacity due to the mechanical indicator Automatic counting is especially desirable in aircraft probes of clouds. Details of equipment devel oped are described and well illustrated. *Subject Headings:* **1. Ice nuclei counters 2. Photoelectric nuclei counters.**—*Authors' abstract and M.R.*

10L–497 551.508.91:551.508.93:551.510.42 or 535.24:551.510.42

Makhon'ko, K. P., **Primemenie mikrofotometra k schetnomu analizu atmosfernoĭ pyli.** [Use of a microphotometer for the quantitative analysis of atmospheric dust.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, 9:1164–1172, **1957.** 2 figs., ref., 15 eqs. **DWB**—The author describes a method for determining the number of microscopic particles deposited on a slide by using the micro photometer MF-4. The slide is placed upon the platform of the microphotometer under the ob jective and is illuminated under an angle of approximately 80° by a beam light reflected by the slide. The light does not enter the objective but is scattered by the particles and on entering the slit of the photoelement it causes a deflection of the galvanometer pointer. Since the deflection of the pointer is proportional to the illuminations of the slit it is only necessary to find the dependence of the galvanometer deflections upon the number of particles scattering light. Formulas are developed for relating particle size to galvanometer deflection and for applying this photometer technique to determining the distribution of dust on the precipitating surfaces of an apparatus which catches dust, to determining the coefficient of transition from weight to numerical indices of atmospheric dust content and to the development of an objective calorimetric method for determining the concentration of dust particles in the atmosphere. *Subject Headings:* **1. Microphotometers 2. Dust content of air.**—*I.L.D.*

10L–498 551.508.91:551.574.11

Metnieks, A. L. (*School of Cosmic Physics, Dublin Inst., Ireland*), **On F. Verzár's photo-electric automatic nucleus counter.** *Geofisica Pura e Applicata*, Milan, 36:41–48, Jan./April **1957.** 4 figs., 2 tables, 8 refs. **DLC**—A Verzár condensation nucleus counter with automatic recording was tested under constant and controlled conditions in the laboratory and compared with the standard photo-electric nucleus counter of high precision of the School of Cosmic Physics. The photographic records of the fog formation in the cylindrical cloud chamber of the Verzár automat made with galvanometers of 0.019 sec and 1.0 sec periods show that a galvanometer of 1 sec period cannot follow the rapid formation and disappearance of the fog, apparently due to the horizontal arrangement of the fog tube and the absence of an insulating wet lining. The Verzár automat is an excellent apparatus for continuously recording concentration of condensation nuclei. Its calibration curve, however, would

quire adjustment if the photoelectric nucleus counter of the School of Cosmic Physics in Dublin ere accepted as standard. A new calibration curve deduced from the Dublin comparisons made far is given. *Subject Headings:* **1. Condensation nuclei counters 2. Verzar condensation nuclei unter.**—*Author's abstract.*

10L–499 551.508.91:551.574.11

Murphy, T. (*School of Cosmic Physics, Dublin Inst. for Advanced Studies*), **On the fog formation the photo-electric counter.** *Geofisica Pura e Applicata*, Milan, 31:26–31, May/August **1955.** figs., 2 refs. English and German summaries p. 26. Discussion p. 29–31. **DWB, DLC**—The peration of a photoelectric nucleus counter has been examined in detail to investigate the causes of ncertainties in the readings with a photographically recording galvanometer. Various peculiarities re pointed out and it is suggested that these are the result of deposition of fog droplets on the glass osing plates and limit the accuracy of a counter to about 5%. Unsuccessful attempts to eliminate is deposition are given and the possibility of solution is offered by reverting to a different form of g chamber. *Subject Headings:* **1. Photoelectric nuclei counters 2. Fog deposition on instruments.** -*Author's abstract.*

10L–500 551.508.91:551.574.11

Murphy, Thomas (*School of Cosmic Physics, Dublin, Ireland*), **The formation and disappearance f fog in photo-electric nucleus counters.** *Geofisica Pura e Applicata*, Milan, 36:35–40, Jan./April **1957.** 4 figs., 3 refs. **DLC**—English and German summaries p. 35. In photoelectric nucleus ounters, the fog begins to form on expansion and is complete in less than one sec. Within a few conds it begins to disperse by fall under gravity and by evaporation. Both the formation and the isappearance depend on the diameter of the fog tube. It is easier to construct an accurate counter hen the diameter is less than 3.8 cm. *Subject Headings:* **1. Photoelectric nuclei counters 2 Fog ormations on nuclei counters.**—*Author's abstract.*

10L–501 551.508.91

Pollak, L. W., **Improvements to the condensation nuclei counter with photographic recording nd the frequency distribution of nuclei counts.** *International Union of Geodesy and Geophysics ssociation of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** 374–381. 3 figs. (incl. photo), table, 9 refs. **DWB**—The author describes with the aid of a iagram and photograph the structure of an improved condensation nuclei counter based on Aitken's rinciple and using photographic recording through a microscope. These include a built-in fully ovable graticule, dark ground illumination to illuminate the graticule, the addition of a second ampling pump etc. The use of this apparatus in recording and counting of nuclei is described riefly and frequency concentration of winds is presented. It was found that Poisson's exponential unction represents adequately the frequency distribution of nuclei counts. *Subject Heading:* . **Condensation nuclei counters.**—*I.L.D.*

10L–502 551.508.91:551.574.1:778.31

Pollak, L. W. and Daly, J. (*both, School of Cosmic Physics, Dublin Inst., Ireland*), **A condensation ucleus counter with stereo-photomicrographic recording.** *Geofisica Pura e Applicata*, Milan, 6:27–34, Jan./April **1957.** 6 figs. (incl. photos), 5 refs. **DLC**—In order to discriminate better in hotograms of the graticule of an Aitken type nucleus counter between droplets formed around the uclei and spurious condensation products or extraneous matter on both sides of the graticule, a ucleus counter with stereophotomicrographic recording has been constructed. Its description ogether with a sample stereogram is given. The advantages of stereophotographic recording are emonstrated. Stereophotographic recording makes it possible to dispense with the glass graticule altogether, and to follow the tracks of the droplets during their fall in the receiver. Their counting n any plane or volume is carried out by the same methods as used in stereophotogrammetry. Simple tereometers are considered sufficient for this purpose. Stereograms of falling droplets formed on condensation nuclei when photographed after removing the glass graticule are reproduced. They make directly visible and record for the first time, the complicated paths which, due to turbulence, the falling droplets in the receiver of an Aitken counter describe and they demonstrate the difficulty in applying Aitken's theory under these conditions. The experimental model of a condensation nucleus counter employing the principle of the slit ultramicroscope combined with stereophoto-micrographic recording is depicted. *Subject Headings:* **1. Condensation nuclei counters 2. Stereo-photomicrographic recording condensation nuclei counter.**—*Authors' abstract.*

10L–503 551.508.91

*Wieland, Walter (*Central Met. Service, Locarno-Monti*), **Eine neue Methode der Kondensations-kernzählung.** [New method of condensation nuclei counting.] *Geofisica Pura e Applicata*, Milan,

30(1):137–143, Jan./April **1955.** 6 figs., 6 refs. German, English and Italian summaries p. 13 **DLC**—A method of nuclei collection on varnished glass plates and later electronic (photoelectr counting, is described and illustrated, and comparative data obtained from such counts tabulat and analyzed. It is shown that the expansion nuclei counter does not detect some of the most acti (meteorologically) nuclei such as large NaCl nuclei which falls out before expansion whereas the are well indicated by the present method. Completely automatic counters as well as the Scho counter allow these large nuclei to fall out before expansion. *Subject Headings:* **1. Condensati nuclei counters 2. Scholz nuclei counter 3. Photoelectric nuclei counters.**—*M.R.*

INSTRUMENTS FOR MEASURING VISIBILITY (551.508.92)

10L–504 551.508.9

Atkins, W. R. G. and Poole, H. H., **Uses of the globe photometer.** *Nature*, London, 175(4466 1003, June 4, **1955.** 2 refs. **DWB**—After mentioning earlier instruments for measuring illuminatic at a shaded point, authors refer to a thin film caesium-on-silver-oxide vacuum photocell of consta sensitivity. *Subject Heading:* **1. Photometers.**—*C.E.P.B.*

10L–505 551.508.92:535.24

*Cosden, T. H., **Recording horizontal atmospheric transmission of light by night and day.** *U. Naval Research Laboratory, NRL Report*, 4570, July 8, **1955.** 11 p. 14 figs. (incl. photos). **DWB** A transmissometer which uses a modulated source and a tuned photoelectric detector has bee constructed and tested. The device will operate over long (10 mi) or short paths and has prove reliable, stable, and accurate for long periods. One transmissometer has been operated continuousl for 1400 hrs with no difficulty. The transmission readings are good to ±2% over a 700 hr perioo The device is a relative monitoring system and must be calibrated to give absolute visual transmissior Calibration is carried out by means of visual photometry. *Subject Headings:* **1. Transmissometer 2. Photoelectric photometers.**—*Author's abstract.*

10L–506 551.508.9

Dollfus, Audouin, **Photomètre à double image pour comparer les tâches de la surface d'un planète.** [Double image photometer for the comparison of spots on the surface of a planet.] *Aca démie des Sciences, Paris, Comptes Rendus*, 243(25):2023–2025, Dec. 17, **1956.** 5 refs. **DLC**—Th instrument described serves to make direct visual observations of luminescence on the surface o planets. A birefringent micrometer produces two orthogonally polarized images. These super posed upon each other and one of them is dimmed by a known value; the disappearance o fringes indicates brightness values. One of the advantages of the method is independence from variations of atmospheric absorption. *Subject Headings:* **1. Photometers 2. Planetary luminescence observation.**—*G.T.*

10L–507 535.24:551.508.92

Ganson, A. and Montel, M. (*Lab. of physical chemistry, Paris*), **Perfectionnements du micro photomètre de Chalonge.** [Improvements in the Chalonge microphotometer.] *Journal de Physi que et le Radium*, Paris, 19 (Supp. to No. 12):171A–175A, Dec. **1958.** 6 figs. French and English summaries p. 171A. **DLC**—Optical and mechanical modifications are described, which have pro vided new improvements which allow the study of spectra of large size, recorded on large-grain plates. With the new optical system, slit images 25 mm high, uniformly illuminated, are given on the plate. With the help of several new mechanical additions, the slit can be adjusted in a continuous way, and a better precision is obtained in the relative orientation of the slits and the plates. The addition of a new diaphragm allows operation with a constant flux, without shifting the color temperature of the lamps. Three studies of specific cases have been made, in order to evaluate the effects of the improvements on the reproductibility and resolving power of the apparatus. *Subject Headings:* **1. Microphotometers 2. Chalonge microphotometer.**—*Authors' abstract.*

10L–508 551.508.92

Hynek, J. Allen and Hosfeld, Roger, **Atmospheric transmission of starlight and relative solar intensity observations.** Ohio. State Univ. Research Foundation, Contract AF 19(604)-964 Final Report, May **1957.** 6 p.—The primary objective of this project has been the design, construction, and testing of a specialized photometer for direct photoelectric comparisons of the sun with stars during the daytime. This work is described in Section II. An auxiliary program has been the continuation of stellar scintillation and seeing studies initiated under a previous contract, AF 19(604)-41. Progress under the present contact is summarized in Section III. *Subject Headings:* **1. Photometers 2. Stellar scintillation 3. Starlight intensity during daylight.**—*Authors' abstract.*

10L–509 551.508.92

Foster, Norman B. (*U. S. W. B., Wash., D. C.*), **A recording daylight illuminometer.** *Illuminating Engineering*, New York, 46(2):59–62, Feb. **1951.** 7 figs., 11 refs. **DLC**—An instrument developed by the U. S. Weather Bureau for recording daylight illumination intensities is described and illustrated. The sensing element is an improved barrier layer cell; it is connected with a self-balancing potentiometer recorder. Linearity of response, angular response, effect of ambient temperature and spectral response are discussed and graphically analyzed. Five instruments of this kind are now being operated by the Weather Bureau in various Eastern cities with the primary purpose of "correlation between daylight intensity and the power load associated with electric lighting." *Subject Headings:* **1. Recording daylight illuminometers 2. Daylight illumination measurement instruments.**—*G.T.*

10L–510 551.508.92

Kremen, Jerome and Shapiro, Justin J. (*American Instrument Co., Inc., Silver Spring, Md.*), **The design of an optical system for the absolute measurement of turbidity.** *Optical Society of America, Journal*, 44(6):500–501, June **1954.** 2 refs., 3 eqs. **DLC**—Designed for use in solutions. *Subject Heading:* **1. Turbidity measurement instruments.**—*M.R.*

10L–511 551.508.92

Krumbiegel, Johannes, **Lichtelektrische Messungen an ZnS-Einkristallen.** [Photoelectric measurements on whole crystals of zinc sulphide.] *Naturwissenschaften*, 39(19):447, Oct. **1952.** fig., 2 refs. **DWB**—Determinations are reported for wave lengths 400–1300 mμ, with maxima at 730 and 1150. *Subject Heading:* **1. Photoelectricity.**—*C.E.P.B.*

10L–512 551.508.92

Kushner, Lawrence M. (*Surface Chemistry Section, National Bureau of Standards, Wash., D. C.*), **A design for an absolute light-scattering photometer.** *Optical Society of America, Journal*, 44(3):155–159, **1954.** 5 figs., foot-refs. **DWB**—An optical design for the receiver of a light scattering photometer is described. The design lends itself to a simple analysis, in terms of geometrical optics, which shows that absolute measurements of the Rayleigh factor are easily made. Modifications of the receiver of a Brice-Phoenix photometer in use in this laboratory are described and analyzed. A preliminary value of 46×10^{-6} cm^{-1} at 436 mμ and 23°C is given for the Rayleigh factor for benzene. *Subject Heading:* **1. Photometers.**—*Author's abstract.*

10L–513 551.508.92:551.521.16:551.593.55

Lengauer, G. G., **Zorevoĭ fotometr so zvesdoobrazheniem.** [Glow photometer with star-like image.] *Astronomicheskii Zhurnal*, Moscow, 27(5):315–319, **1950.** 2 figs. **DLC**—A portable photographic photometer for the measurement of surface brightness (mainly for daybreak and twilight glows) is described. It is based on the method of Maxwell-Fabry's ocular "pupil," in which the selected pupil diameter is comparable to the efficiency of the photo emulsion. Because of that, and depending on the brightness of the investigated sections of the sky, the images of this ocular pupil are obtained on the photos in the form of circles of different size similar to focal images of stars. There is no need to use microphotometers for the further working over of the photos because the processing can be carried on by the scale method which is common in focal photometry. *Subject Headings:* **1. Photometers 2. Twilight illumination.**—*A.M.P.*

10L–514 551.508.92

Middleton, W. E. Knowles, **A registering low-level photometer.** *Optical Society of America, Journal*, 44(4):303–305, April **1954.** 3 figs., 6 refs. **DLC**—A visual photometer has been devised which facilitates observations in the mesopic and scotopic ranges. By a special mechanical construction the observer is enabled to record about 60 readings without the necessity of removing his eye from the eyepiece of the instrument. Apart from its control box, the instrument is easily held in the hand. The field has an apparent diameter of 12° and is divided vertically. *Subject Heading:* **1. Photometers.**—*Author's abstract.*

10L–515 551.508.92

Morris, A.; McGuire, Frederick L. and Van Cott, Harold P. (*all, U. S. Naval Medical Research Lab., New London, Conn.*), **Accuracy of the Macbeth illuminometer as a function of operator variability, calibration, and sensitivity.** *Optical Society of America, Journal*, 45(7):525–530, July **1955.** 7 figs., 4 tables, 8 refs. **DLC**—The accuracy of the Macbeth illuminometer was studied by measuring a known source. The mean of a number of measurements from a number of operators gives a precise estimate of brightness. The most adequate measures are obtained when "calibration" amperage of the working lamp is carefully determined and maintained with precision. To establish the relation between the sensitivity of the eye and brightness measurements, the difference thresholds

for lighter and darker were determined. The close similarity of the curves for the threshold dat and for the brightness measurements demonstrates that "match" judgments are essentially dis criminations of "lighter" and "darker." *Subject Heading:* **1. Illuminometers.**—*Authors' abstract.*

10L–516 551.508.92:53.08

Mucket, G., **Uber einen neuen registrierenden Sichtmesser,** [A new recording visibility meter. *Germany. Deutsche Demokratische Republik. Meteorologischer und Hydrologischer Dienst, Ab handlungen,* 5(39), **1956.** 36 p., 17 figs., table, 12 refs. **DWB.** Review by H. Henning in *Zeitschrift für Meteorologie,* 10(9):286, Sept. **1956.**—A new recording photoelectric visibility meter develope in 1953–4 at Lindenberg, is described in theory and its construction, actual operation calibration accuracy, and results of some measurements set forth at some length and illustrated with photographs wiring diagrams, recorder records, etc. The principle of extinction of a light source applied over a optical path of varying length up to 700 m (tests were made at Lindenberg and comparison made with a Fortzik recording meter in 1954), is illustrated. *Subject Headings:* **1. Recording visibility meters 2. Fortzik visibility meter 3. Lindenberg, Germany.**—*M.R.*

10L–517 551.508.762 551.508.92:535.242

Murphy, Joseph S., **Good news for pilots: instrument-approach aids installed.** *American Aviation,* Wash., D. C., 18(5):38, Aug. 2, **1954.** diagr. **DWB**—The transmissometer for measuring runway visibility, and the rotating ceilometer for measuring cloud height in the approach zone being installed at major airports in the U. S. by the U. S. Weather Bureau, are described and the Crouse-Hinds equipment illustrated. The transmissometer was developed by the National Bureau of Standards, and the ceilometer by U. S. Weather Bureau engineers L. W. Foskett and R. H. Guenthner. *Subject Headings:* **1. Airways weather reporting 2. Visibility instruments 3. Transmissometers 4. Ceilometers. I. Foskett, L. W. II. Guenthner, R. H.**—*M.R.*

10L 518 551.508.92

Nasibov, G. M., **Portativnyi izmeritel' vidimosti.** [A portable instrument for measuring visibility.] *Gigiena i Sanitariia,* Moscow, 3:54–55, March **1953.** table. **DLC**—A great disadvantage of American visibility meters is the fact that the light filters shut off the whole visual field and thus change the conditions of adapation. This, inevitably, provokes an alteration of the contrast threshold and misrepresents the true level of contrast sensitivity of the eye. The simple portable visibility meter described in this paper is based on the principle of compensation of luminous intensity and is intended for the evaluation of illumination conditions during operations not requiring sharp visibility. As operation of the instrument is based on intensity compensation, the visibility is expressed by the relationship of the brightness of background to the contrast threshold of the background. The structure of the instrument is very simple and it can be manufactured in any workshop having the means of determining the transmission coefficient of light filters. *Subject Heading:* **1. Visibility meters.**—*A.M.P.*

10L–519 551.508.92

Nielsen, Erik Tetens and Haeger, James S. (*both, Fla. State Board of Health, Vero Beach, Fla.*), **A simple method of estimating low light intensities.** *Ecology,* Durham, N. C., 36(3):525–526, July **1955.** 2 tables, 2 refs. **DWB, DLC**—Light intensity was determined by the use of 2-color combinations and recording the moment when the two colors could no longer be distinguished. The manner of standardizing the observations and calibrating the device is described. Tables give illuminations determined for the merging points of colored thread combinations and merging moments for colored thread combinations and corresponding light measurements on a moonless evening. *Subject Headings:* **1. Light intensity measurement techniques 2. Photometers.**—*I.L.D.*

10L–520 551.508.92:551.521.18:535.33

Pearson, Carl A. (*U. S. Navy Underwater Sound Lab., New London, Conn.*) and Boettner, Edward A. (*Univ. of Michigan*), **Horizontal atmospheric transmittance measurements with a thallous sulfide cell transmissometer.** *Optical Society of America, Journal,* 46(1):54–59, Jan. **1955.** 10 figs., 6 refs., eqs. **DWB, DLC**—Measurements of horizontal atmospheric transmittance were made over 1.24 and 4.07 sea mile paths with an automatically recording near infrared transmissometer. The transmissometer comprised a tungsten source, modulated at 60 cps, and a thallous sulfide cell receiver. The visual transmittance was simultaneously recorded with a photomultiplier tube receiver using the same source. New results of total transmissivity per sea mile in the 0.7 to 1.1 μ region of the spectrum are presented and compared with results of the Naval Research Laboratory and the Admiralty Research Laboratory in the visual and infrared regions of the spectrum. A graph of transmissivity vs. wavelength from 0.3–12 μ was made. This graph is useful in finding the transmissivity in the "windows" of the infrared spectrum when the transmissivity has been determined at a particular

wave length or for a small band of wave lengths. *Subject Headings:* **1. Infrared transmissometers 2. Infrared spectra.**—*Authors' abstract.*

10L–521 551.508.92:551.521.16

Pollak, L. W. (*School of Cosmic Physics, Dublin Inst. Merrion Square, Dublin*), **A simple integrating lightmeter.** *Geofisica Pura e Applicata*, Milan, 40:200–202, **1958.** 2 figs., ref. English and German summaries p. 200. **DWB**—A cheap and simple integrating light meter installed at the School of Cosmic Physics, Dublin, is described and illustrated. It consists of 3 silicon photoelements in series, in a watertight and airtight housing (produced by B. LANGE, Berlin). The output curves, as shown on a graph, are linear up to high intensity (ca 10,000 lux) illuminations, and is 10 times that of other types of photoelement. The element proved to be constant over long periods of use, and to operate without fatigue and with inertia <0.01 sec. The current is independent of temperature from −60° to 175°C. Cost of receiver was about £12. A low inertia integrating motor and mechanical counter, built by Electro Methods, Ltd. of Hendon, London, is directly connected with the silicon photoelements. *Subject Headings:* **1. Integrating illuminometers 2. Silicon photoelements.** —*M.R.*

10L–522 551.508.92

Roach, F. E., **The intercalibration of airglow photometers.** *U. S. National Bureau of Standards, NBS Report* 5591, July 21, **1958.** 3 p. 10 figs., 9 tables, 3 eqs. **DWB**—The calibration of the FP-1 photometer and its functions as a better means of measuring the absolute brightness of the night glow is shown in this report. Its results were compared to those obtained from the standard photometer in the Optical Laboratory at Tokyo. Differences in the two results are accounted for. Results from Haute Provence are cited. *Subject Headings:* **1. Photometer calibration 2. Night airglow photometers 3. FP-1 photometer.**—*N.N.*

10L–523 535.3 551.508.92

Waldram, J. M., **The photometry of projected light.** *Illuminating Engineering Society, London, Transactions*, 16(8), **1951.** 23 p. 12 figs, 31 refs. Abstracted from reprint.—This paper discusses the problems of measurement and performance of long distance projectors such as searchlights. Sec. 2.4 deals with methods of determining atmospheric transmission, Sec. 3 with auxiliary apparatus. Laboratory technique is also discussed. *Subject Heading:* **1. Photometry.**—*C.E.P.B.*

INSTRUMENTS FOR MEASURING SCATTERING OF LIGHT (551.508.93)

10L–524 551.508.93:551.521.16 551.521.32

Cohn, Byron E. et al., **Daylight luminescence and infrared absorption.** Denver. Univ. Dept. of Physics, Contract AF 19(604)-224, Research Report, Final Report, **1955.** 124 p. 7 graphs, numerous photos figs. **DWB**—Report summarizes work in developing and testing instruments for measuring 1) daylight luminescence and to be used in 2) Biaxial pointing control and 3) sky brightness equipment. Details of developed instrumentation and performance curves as well as photos and line drawings of equipment constitute bulk of report. Results of rocket flights and performance during these flights are included. Spectrograms obtained from high altitude balloon flights as well as from the ground are presented. *Subject Headings:* **1. Daylight luminescence measurement instruments 2. Biaxial pointing control 3. Sky brightness instruments 4. Infrared absorption.** —*M.R.*

10L–525 551.508.93:629.13.014.5

Cox, J. W. and Greenaway, S/L K. R. (*Defence Research Board, Dept. of Natl Defence, Canada*), **A twilight computer and planisphere for high latitude navigation.** *Navigation*, Los Angeles, 3(3): 67–73, March **1952.** 3 figs. **DWB**—A computer for determining time and duration of twilight in high latitudes and its use are described in detail. The computer consists of a slider which moves under a transparent rotatable surface. It accounts for date, time of the day and position, speed, direction and height of the aircraft. The computer is shown in a photo and the principle of its operation illustrated in diagrams. Accuracy and special applications are discussed. A planisphere on the reverse side of the computer is also shown in a photo and briefly discussed. The computer has been adopted by the RCAF and successfully used in flight. *Subject Headings:* **1. Twilight computers 2. Planispheres 3. Air navigation aids.**—*G.T.*

10L–526 551.508.93

Donaldson, R., **Stray light in monochromators.** *Journal of Scientific Instruments*, London, 29(5):150–153, May **1952.** 6 figs., 6 refs. **DWB**—A method of measuring stray light in single

monochromators by means of a double monochromator is described. Various types of monochromators, employing (a) Littrow prism, (b) diffraction grating, (c) replica of diffraction grating and (d) composite prism with only two glass-air surfaces, have been examined by this method and comparative results obtained. An experimental type of monochromator where the light traverses the same prism twice is shown to have the same order of stray light as the conventional double monochromator. With the experimental instrument set at wavelength 500 mμ, the intensity of the stray light of wavelength 480 mμ or 520 mμ was found to be less than 10^{-5} of the intensity of the directly transmitted light. *Subject Heading:* **1. Monochromators.**—*Author's abstract.*

10L–527 551.508.93:535.242

Douglas, C. A. and Nimeroff, I., **Design and calibration of a remote-indicating, photoelectric brightness meter.** *U. S. National Bureau of Standards, NBS Report*, No. 4421, Nov. 29, **1955.** 9 p. 10 figs. (most fold.), 3 tables, **DWB** (621.37 U585de)—This report describes the design of a remote-indicating, photoelectric brightness meter and gives the results of the calibration and test of the instrument. The instrument was designed for use in making horizon-sky brightness measurements during the visibility tests being conducted at Newark Airport. *Subject Headings:* **1. Visibility measurements 2. Sky brightness measurements 3. Photoelectric photometers 4. Newark Airport, N. J.**—*Author's abstract.*

10L–528 551.508.93

O'Konski, Chester T. and Doyle, George J. (*both, Univ. Calif. at Berkeley*), **Light-scattering studies in aerosols with a new counter-photometer.** *Analytical Chemistry*, Wash., D. C., 27(5): 694-701, May **1955.** 6 figs., 4 tables, 30 refs., 7 eqs. **DLC**—The functions of a recording light scattering photometer and electronic particle counter were combined in a single instrument, employing an improved right angle optical system and a single electron multipler phototube. Techniques were developed for standardization of the instrument by light scattered from filtered glasses. As expected from theoretical considerations, the intensities from helium, hydrogen, nitrogen, carbon dioxide, sulfur dioxide, and methyl chloride increased approximately with the square of the mean molecular polarizabilities. The limit of sensitivity of the photometer was 3×10^{-11} gram per liter of a test aerosol 0.3 μ in diameter. Procedures were developed for producing uniform aerosols from uniform hydrosols. Pulse amplitudes of test aerosols 0.33, 0.5, and 1 μ in diameter obeyed the remarkably simple law of being proportional to the square of the particle diameters. The resolving power of the counter lies within a standard deviation of 8% in diameter, and the lower limit of sensitivity for single particles is a diameter of 0.3 μ. *Subject Headings:* **1. Recording photometers 2. Particle counters 3. Light scattering in aerosols.**—*Authors' abstract.*

10L–529 551.508.93:523.32

Rösch, Jean, **Photomètre visuel pour l'étude de la lumière cendrée de la lune.** [Visual photometer for the study of earthshine.] *Revue d'Optique, Paris*, 37(9):458–466, Sept. **1958.** 6 figs., 2 refs. **DLC**—Description of a photometer in which the cat's-eye is replaced by a pair of neutral wedges, the conception of which allows the vitreous reflections to occur within an angle independent of the relative position of the two images. The author gives the principle of functioning, the main features of the essential parts of this instrument, the technique of observations, the testing and the various possible uses of this photometer. *Subject Heading:* **1. Visual photometers.**—*A.V.*

10L–530 551.508.93

Sasaki, Tadayoshi, (*Tokyo Univ. of Fisheries & Scien. Res. Inst.*); Oshiba, Gohachiro; Watanabe, Seiichi and Okami, Noboru, (all, *Scientific Res. Inst., Tokyo*), **A submersible turbidimeter.** *Records of Oceanographic Works in Japan, Tokyo*, Special Number, No. 2:116–119, March **1958.** 4 figs. **DWB**—Many types of submersible turbidimeters for various purposes have hitherto been made and there have been a lot of reports on the results using the instruments and we have also made a submersible turbidimeter for measuring high turbidity in waters such as artificial lakes and reported the results using our instrument. Now we have made another submersible turbidimeter for measuring turbidity at depths up to 100 m in order to investigate optical characters of sea waters which have an intimate relation to marine creatures, and report the results of the experiments using this new instrument. The new turbidimeter, which has a wide range, has been constructed so as to measure medium turbidity of sea waters. *Subject Heading:* **1. Turbidity measurement instruments.**—*Authors' abstract.*

10L–531 551.508.93:551.593.7

Suzuki, Shigemasa and Tsuchiya, A. (*both, Tokyo Astronomical Obs., Univ. of Tokyo, Japan*), **A time-sharing polarimeter at 200 Mc.** *Institute of Radio Engineers, N. Y., Proceedings*, 46(1): 190–194, Jan. **1958.** 7 figs., 5 refs., 9 eqs. **DLC**—A radio polarimeter at 200 Mc of time sharing type is described. This instrument observes a set of two circular and four linear components of

polarization in 1/200/sec with 1/1200/sec interval for each component, so that a practically simultaneous observation of rapidly varying phenomena such as a solar burst is made possible. Some details on the electronic switching, the square-law detector, and the method of calibration and checking are discussed. *Subject Heading:* **1. Polarimeters.**—*Authors' abstract.*

10L–532 551.508.93 535.24

Vassy, Etienne and Vassy, Arlette, **Appareil pour la measure de l'épaisseur d'eau condensable de l'atmosphère.** [Instrument for measuring the depth of water vapor in the atmosphere.] *France. Ministère de l'Aviation, Publications Scientifiques et Techniques*, No. 175, **1941.** 34 p. 23 figs., 21 refs. **DLC**—An instrument measuring atmospheric light transmission is described. It consists essentially of a monochromator and a photometer. Light transmission is measured at two different spectral positions of the monochromator and water vapor depth (amount of precipitable water) determined from the two values obtained. A photograph and circuit diagrams of the instrument are presented and calibration problems discussed. *Subject Headings:* **1. Light transmission instruments 2. Monochromators 3. Photometers 4. Water vapor measurement.**—*G.T.*

INSTRUMENTS FOR MEASURING ATMOSPHERIC ELECTRICITY (551.508.94)

10L–533 551.508.94:551.594.12 537.56

†Banks, Floyd R., Jr., **Final research report on air ionization gauge (dual ionization gauge).** Vacuum-Electronic Engineering Company, N. Y., Contract AF 19(122)-390, Report No. 390-8, Oct. 1–Nov. 30, **1952,** pub. Feb. 27, **1953.** 24 p. 52 refs. **DWB**—This, the final report prepared under the contract, is a summary review of the research which has been conducted on the dual or differential ionization gage, and of the material contained in the seven preceding reports. The principles of operation of the dual gage are reviewed; the apparatus used during most of the measurements is described, and data which have been obtained are analyzed and discussed. The design features and method of operation of a single stage differential ionization gage are reviewed, and some particular areas of usefulness of a gage of this type are indicated. A summary of the results and conclusions is given in Sec. 1, 3 (p. 4). *Subject Headings:* **1. Ionization measurement instruments 2. Air ionization gages 3. Ionization data.**—*Author's abstract.*

10L–534 551.508.94 551.594.12

Beau, Georges; Blanquet, Mme. Lucien; Blanquet, Paul, et al., **Contribution à l'étude de l'enregistrement de la charge spatiale atmosphérique.** [Contribution to the study of recording atmospheric space charge.] *Académie des Sciences, Paris, Comptes Rendus*, 243(10):784–786, Sept. 3, **1956.** fig., table. **DLC**—An aspirator type electrometer tube apparatus and recorder for continuous measurement of atmospheric space charge carried by large ions, are described. The first five years' records obtained with one mobile and three stationary instruments (two at Clermont-Ferrand and one at Bordeaux) show diurnal and seasonal variations of atmospheric space charge, with superimposed fluctuations due to thunderstorms, fog and other meteorological phenomena. There is also a strong microclimatic effect as can be seen by comparing simultaneous measurements at the different stations. *Subject Headings:* **1. Electrometers 2. Atmospheric electricity measurement instruments.**—*G.T.*

10L–535 551.508.94:551.594.11

Buben, Jiří (*Geophysical Inst., Charles Univ., Prague*), **Dynamic gradient-graph of the electric potential in the atmosphere.** *Studia Geophysica et Geodaetica*, Prague, 2(3):269–273, **1958.** 3 figs., 7 refs. Russian summary p. 273. **DWB**—An instrument based upon the principle of dynamic field intensity measurement, constructed by the author for recording potential gradient at the Geophysical Institute of the Czechoslovak Academy of Sciences is described. The illustrations include a schematic circuit diagram, a block diagram, a section of the collector plate, a calibration curve and sample records for fair and for rainy weather. *Subject Heading:* **1. Potential gradient meters.**—*G.T.*

10L–536 551.508.94

Cornell Aeronautical Laboratory, Inc., Buffalo, N. Y., **Study of the earth's electrical field.** Contract AF 19(122)-467, Quarterly Reports, No. 9, 11, 12, Nov. 25, **1953,** March 26 and May 11, **1954.** 3 pieces. diagrs., photos. **DWB**—In these 3 reports, the progress in instrumentation is described and the equipment which had been constructed during each quarter illustrated. The purpose of the project is to investigate the earth's electric field and atmospheric electric conductivity and to correlate them with meteorological parameters. Automatic recording of field and conductivity fluctuations is emphasized. Pressure, temperature, humidity, solar radiation intensity and rainfall are recorded, and weather, wind direction and speed, visibility, cloud types, cloud cover and ceiling

height are recorded as well as the electric field and positive and negative conductivity. *Subject Headings:* **1. Atmospheric electricity measurement instruments 2. Automatic recorders.**—*M.R.*

10L–537 551.508.94

Dolezalek, H., **Disturbances in sensitive electrometer tube amplifiers.** Germany. Deutscher Wetterdienst. (Aachen Met. Obs.) Contract AF 61(514)-640, Technical Note No. 3, January 10, **1956.** 25 p. 8 refs. **DWB** (M94 A111t)—As a supplementary note to Technical Note No. 2 this paper communicates some experiences in the construction and use of electrometer tube amplifiers in atmospheric electricity measurement techniques. It offers some not always self evident suggestions in this field. A fuller but more general presentation of this problem was given at another place (H. Israel and H. Dolezalek, 1955); here, more specific experiences are enumerated. *Subject Heading:* **1. Atmospheric electricity measurement instruments.**—*Author's abstract.*

10L–538 551.508.94

Dolezalek, H., **On antennas for atmospheric electrical measurements.** Germany. Deutscher Wetterdienst (Aachen Met. Obs.), Contract AF 61(514)-640, Technical Note No. 4, Oct. 15, **1956.** 78 p. 18 figs., 96 refs., eqs. **DWB**—This report is a detailed manual that serves as a guide for technical measurement of atmospheric electricity and for the recording equipment. Atmospheric electrical measurement of representative elements is discussed as well as the individual antennas for the measurement of the air-earth-current density, the potential gradient and the two polar atmospheric conductivities. Two sections of this paper are devoted to the actual installation of the antennas. This text does not treat the measurement of point discharge current, precipitation current, lightning current, counting of ions and condensation nuclei. *Subject Heading:* **1. Atmospheric electricity measurement instruments.**—*N.N.*

10L–539 551.508.94

Fedele, D. and Vittori Antisari, Ottavio, **Sonda dinamica per la misura del campo elettrico terrestre.** [Dynamic recorder for use in the measurement of the earth's electric field.] *Rivista di Meteorologia Aeronautica,* Rome, 15(1):21–24, Jan./March **1955.** 5 figs., 4 refs. French, English and German summaries p. 21. **DLC.** (Also in: Italy. Servizio Meteorologica dell'Aeronautica, **Il Servizio Meteorologico dell'Aeronautica Italiana alla X Assemblea Generale U. G. G. I.** Rome, **1954.** p. 41–44. 5 figs., 4 refs. English summary p. 41.) **DWB**—A new type of dynamic collector, for the earth's electric field, obtained by applying the zero reduction method to the rotating screen collector type, is described. The measurements become thus independent of the amplifier gain variations, and of the insulation conditions of the collecting plate. They are also independent of the amount of ground noise and external disturbances captured by the collector. *Subject Heading:* **1. Atmospheric electric field measurement instruments.**—*Authors' abstract.*

10L–540 551.508.94

Fedele, D. and Vittori Antisari, O., **Enregistreur du champ électrique du type dynamique avec réduction de la mesure à zero.** [A dynamic type recorder of the electric field with reduction of the readings to zero.] *International Union of Geodesy and Geophysics, Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 402–404. **DWB**—This new model of electric field recorder is obtained by applying the method of reducing the reading to zero to the field mill method of Rangs and it is especially useful for measuring the electric field during atmospheric disturbances. The construction of the apparatus and its use are described. *Subject Heading:* **1. Atmospheric electric field measurement instruments.**—*I.L.D.*

10L–541 551.508.94:551.594.12

Fretter, W. B. and Friesen, E. W. (*both, Univ. of Calif.*), **Cloud chamber for precision measurements.** *Review of Scientific Instruments,* N. Y., 26(7):703–710, July **1955.** 9 figs. (incl. photos), table, 4 refs., eq. **DWB, DLC**—A cloud chamber has been constructed in which accurate measurements of ionization and momentum can be made simultaneously. The chamber has a useful volume of 18 in. by 12 in. by 5 in., contains helium, and is in a magnetic field of 7500 gauss. Procedures have been developed to measure momentum and ionization and to determine the errors. Measurements on 40 protons indicate an average probable error of 7% for an individual measurement of mass by the comparison of ionization and momentum. A calibration technique is used for the determination of the minimum ionization for each case. *Subject Headings:* **1. Cloud chambers 2. Ionization measurement techniques.**—*Authors' abstract.*

10L–542 551.508.94:551.594.12

Gonzalez-Miranda, Luis de Miguel (*Toledo, Spain*), **Aparato contador automático de iones.** [Automatic ion counter.] Madrid, Instituto Geográfico y Catastral, **1954.** 15 p. 5 figs., eqs. **DWB**—

A small ion counter manufactured by Günther Tegetmayer is described and illustrated. It has been recently installed in the Toledo Geophysical Observatory. *Subject Heading:* **1. Ion counters.**—*M.R.*

10L–543 551.508.94

Hoag, Arthur A., **Photoelectric observations of lightning.** *Journal of Geophysical Research*, 56(4):610–611, Dec. **1951.** fig., ref.—Proposes to register sky brightness during thunderstorms by oscillographic records of the output of a photomultiplier, exposed to the sky. Due to the short response time of the photomultiplier (10^{-8} sec) the rapid light changes can be recorded with great accuracy. *Subject Heading:* **1. Lightning recorders.**—*A.A.*

10L–544 551.508.94:551.515.8:551.553.8

Weather recorder. *Instruments*, Pittsburgh, 26(6):910, June **1953. DWB**—A photograph showing a recording unit used at General Electric Research Lab., Schenectady, N. Y. is presented, accompanied by a note explaining the use of instrument which records electric potentials collected by an antenna sensitive to atmospheric conditions (such as the passage of a line squall). The antenna's sensitivity is due to radium impregnated gold foil on its point. *Subject Headings:* **1. Electronic recorders 2. Line squall detectors 3. Atmospheric electricity recorders.**—*G.T.*

10L–545 551.508.94:551.594.13

Kilinski, Erich von, **Verbesserung der Auffangvorrichtung des Potsdamer Vertikalstromgerätes.** [Improvement of the collection device of the Potsdam vertical current apparatus.] *Zeitschrift für Meteorologie*, Berlin, 12(11/12):352–354, Nov./Dec. **1958.** 3 figs., 2 refs. German summary p. 352. **DWB, DLC**—Recordings of the density of electric currents are carried out best by conducting a metal plate across a high resistance to the earth. The vertical current produces a voltage drop in the high resistance which is recorded with an adequately high ohm resistance meter. The sensitivity of such recordings is reduced during the summer by the spider webs. The improvement described by the author to eliminate this disturbance involves a continuous tearing of spider threads by rotating those parts that are threatened by spider web formation. The collection device is described with the aid of a diagram. The procedure for eliminating the measurement effect produced by charges that are influenced by oscillations in potential gradient upon the collection plate is described. In order to reduce the influence of the field oscillations a condensor parallel to the high ohm resistance was inserted so that the time constant $R \cdot C$ of the apparatus was equal to the time constant ϵ_0/λ of the atmosphere; R and C are the entrance resistance and entrance capacity of the apparatus respectively; λ represents the conductivity of air near the ground and ϵ_0 is a constant ($\epsilon_0 = 8.86 \cdot 10^{-14}$ coulomb $\cdot$volt$^{-1}\cdot$cm^{-1}). Then the equation $R \cdot C = \epsilon_0/\lambda$ holds. It can be shown that in this case the influence charge, that is displaced during a field oscillation, serves to charge the condensor so that no additional drop in voltage is produced at the high resistance. *Subject Headings:* **1. Vertical current measurement techniques 2. Atmospheric electricity instruments.**—*I.L.D.*

10L–546 551.508.94:538.56:574

König, Heinz, **Zur Frage der biotropen Wirkung atmosphärischer Storüngen.** [On the biotropic effect of the atmospheric disturbances.] *Annalen der Meteorologie, Medizin-meteorologishce Hefte*, No. 9:26–31, [1954]. 2 figs., 6 photos, 16 refs.—To test biological effects of disturbances, measurements are being made of intensity of radiation on 3–50 kHz and shape and number of impulses. The apparatus is described. When sufficient records are accumulated the biotropic effects will be examined. *Subject Headings:* **1. Electromagnetic wave recorders 2. Biometeorology.** —*C.E.P.B.*

10L–547 551.508.94:551.594.11

Mühleisen, R., **Eine leicht transportable Potentialsonde für luftelektrische Feldmessungen.** [A portable potential meter for atmospheric electrical field measurement.] *Beiträge zur Physik der Atmosphäre*, Frankfurt a.M., 29(2):90–96, **1956.** 4 figs., 2 tables, 9 refs. German, English and French summaries p. 90. **DWB**—A description is given of a simple measuring unit with a radioactive collector and electrostatic voltmeter in vertical arrangement. Its precision was determined by comparison with the older method of the horizontally drawn out wire and is equivalent to this. The dependence of the time of equalization on the starting potential and of air movements was investigated and an explanation is given. Due to these recent and previous considerations it seems advisable to set up a radioactive sonde, possibly above a larger, plain area. *Subject Heading:* **1. Atmospheric field measurement instruments.**—*Author's abstract.*

10L–548 551.508.94:551.594.11

Mühleisen, R., **Verminderung der Isolationsschwierigkeiten bei luftelektrischen Potentialmessungen.** [Reduction of insolation problems in atmospheric electrical potential measurement.] *Beiträge zur Physik der Atmosphäre*, Frankfurt a.M., 29(2):97–101, **1956.** 6 figs., 4 refs. German,

English and French summaries p. 97. **DWB**—A high resistance valve voltmeter permits an effective improvement of insolation by the factor 200 and a reduction of the time of equalization by the factor 25, by carrying automatically sort of a guard ring and a screen nearly to the potential to be measured. *Subject Headings:* **1. Potential gradient measurement 2. Voltmeters.**—*Author's abstract.*

10L–549 551.508.94:551.594.12

*Norinder, Harald and Siksna, Reinhards, **Ions formed in a room by a polonium ion-generator.** *Arkiv för Geofysik*, Stockholm, 2(24):501–514, **1958.** 13 figs., 15 refs. **DLC**—The relationship between ions and the properties of the ionizator and the medical effects of ions are discussed briefly. This is followed by a description of the construction and operation of the polonium ion generator, of the test room and of the measurement procedure and instruments. The results of measurements are presented in graphs and include the following: naturally produced ions in the test room; trend of the concentration of ions in the test room, the polonium ion generator being placed there and used without the separation of ions; separation of negative ions; influence of mixing of air in the test room upon concentration of ions when polonium ion generator was used without separation of ions and when the separator was switched on; mobility of ions, etc. It was found that (1) the increase of the concentration of ions in a test room was not high when the generator was used without separation of ions; (2) the concentration of negative ions increased considerably but not in the entire room when separation of negative ions was used; (3) the distribution of the concentration of ions in the room depended on the mixing conditions; (4) the ion generator formed a jet of ions with different concentration distributions; (5) two groups of positive ions with different mobilities were found; (6) a difference in the distribution function between negative and positive ions was found; and (7) the mobility distribution of separated negative and positive ions formed after switching off the separator resembled that obtained under other conditions. *Subject Headings:* **1. Polonium ion generators 2. Ion production.**—*I.L.D.*

10L–550 551.508.94

Ruttenberg, S., **Modern instruments for atmospheric-electric measurements, Pt. 2.** California. Univ. at L. A., Institute of Geophysics, Contract AF 19(122)-254, Scientific Report, no. 9, June 30, **1955.** 51 p. 19 figs. (incl. photos), 9 refs., 19 eqs.—The instruments described in this report have been developed for the measurement of potential gradient, conductivity, air-earth current density and potential. Instruments were designed for battery operation for field locations where ac power was not available. Stability and accuracy were obtained with simple circuitry by careful consideration of battery drain and minimum amplification. Semiautomatic operation was achieved with the use of timing motors and cams, which increased the usefulness of the conductivity instruments and provided hourly zero checks on some instruments. Successful air-earth current instruments were developed, making use of long time constants in the input. Special high quality condensers, with very low leakage and dielectric absorption made this technique possible. *Subject Heading:* **1. Atmospheric electricity measurement instruments.**—*Author's abstract.*

10L–551 551.508.94:551.594.13

Salvador, O. and Masson, H. (*Lab. of Meteorologic Physics, Dakar*), **Enregistrement continu de la conductibilité ionique de l'air au voisinage du sol.** [Continuous recording of ionic conductivity of the air near the ground.] *Journal de Physique et le Radium*, Paris, 19 (Supp. to No. 12):124A–128A, Dec. **1958.** 4 figs., 2 refs. French and English summaries p. 124A. **DLC**—The method of measuring used is that involving a gas stream. A current of air is made to flow through a cylindrical condenser the outer electrode of which is grounded and the inner electrode successively connected up to the + and − terminals of a battery via a powerful resistance $R = 10^{11}$ ohms. The central electrode traps those small ions which are of the sign opposite to itself, and this produces a difference in potential at the resistor terminals which is proportional to the magnitude it is required to measure. This voltage is then measured by means of a free condenser type electrometer. The reading to be registered is obtained in 3 stages, as follows: 1) positive conductivity; 2) negative conductivity; 3) zero marking. This apparatus can be used either as an ion counter or as a conductance indicator, depending upon the velocity of the air flow. *Subject Headings:* **1. Ionic conductivity measurement instruments 2. Ion counters.**—*Authors' abstract.*

10L–552 551.508.94:551.594.11

Schilling, G. F.; Smith, L. G.; Ruttenberg, S. and Dickinson, R., **Modern instruments for atmospheric-electric measurements, Pt. I.** California. Univ. Institute of Geophysics, Contract AF 19(122)-254, Scientific Report, No. 5, Feb. 1, **1953.** 12 figs., 8 refs. **DWB**—The instruments described in this report have been developed to measure the atmospheric potential gradient and electrical conductivity. The potential gradient meters are of two types: those using the principle of electrostatic induction, and those using a potential equalizer, in these cases, a radioactive collector. The conductivity meters are of the type originated by GERDIEN but with a modified electrical system.

The instruments have been designed to be automatically recording and, in some cases, to have self-contained power supplies. *Subject Headings:* **1. Atmospheric electricity instruments 2. Potential gradient meters 3. Conductivity meters.**—*Authors' abstract.*

10L–553 551.508.94:551.574.1:551.594.25

Sergieva, A. P., **Ob elektricheskikh zariadakh oblachnykh chastits.** [Electric charges of cloud particles.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 3:347–357, March **1958.** 9 figs., table, 19 refs., 2 eqs. **DWB, DLC.** Transl. into English by John Miller, issued by American Meteorological Society, under Contract AF 19(604)-1936, Oct. **1958.** 18 p. Complete.—A method and apparatus for measuring the simultaneously individual electrical charges of a large number of cloud particles are presented. They are based upon the method of T. Gillespie and G. Langeroth (*Canadian Journal of Chem.*, v. 30, **1956** and **1957**) designed for measuring small particles of solid aerosols by precipitating them from an air current in an electrical field. The apparatus described with the aid of a diagram consists of an inlet and inlet filter, which removes all charged particles from the aerosol, and a system of flat condensors, which constitute the working part of two rectifying grids. In addition the installation contains a centrifugal ventilator with a system of attached tubes, a gas meter and a current source. The operation of the apparatus and the meter for measuring the electrical charge are described. The latter is measured by the approximate formula:

$$e = \frac{(x - x_0) m \theta_a}{l \sum_{i=1}^{n} E_i + h \sum_{i=1}^{n} \frac{E_{i+1} + E_i}{2} + k E_{i+1}},$$

where l = length of plates in the filter, E_i = electric charge of the plate; h = length of intervals between plate, k = part of plate extending to the point of deposition, $\theta = f(m, v_a)$ where m = mass of particles and v_a = mean velocity of current. The results of experiments carried out in artificial fogs and in natural clouds are presented in graphs and tables and it is shown that in the former the number of charged droplets depends upon the time of their existence and that in the latter the dispersion of the charge increases with increasing size of the particles. *Subject Headings:* **1. Electrical charges on drops 2. Atmospheric electricity measurement instruments.**—*I.L.D.*

10L–554 551.508.94:551.594.11

Smiddy, M. and Chalmers, J. A. (*Phys. Dept. U. of Durham*), **The double field-mill.** *Journal of Atmospheric and Terrestrial Physics*, London, 12(2/3):206–210, **1958.** 7 figs., 6 refs. **DLC**—A double field mill is described which is automatically brought to the potential of its surroundings and also registers the potential gradient at a point above ground level. *Subject Headings:* **1. Potential gradient measurement techniques 2. Double field mill.**—*Author's abstract.*

10L–555 551.508.94:621.317.7:551.594.2

Vonnegut, Bernard and McCaig, Donald A., **Simple electrometer employing an electrified, nonconducting fiber.** Arthur D. Little, Inc., Contract Nonr-1684(00), [Unnumbered report], Feb. **14, 1957.** 23 p. 8 figs., 9 refs. **DWB**—A simple, rugged, and symmetrical electrometer has been devised which employs a nonconducting, elastic fiber that has been electrically charged. The fiber is fastened at one end and mounted between two parallel conducting plates across which the potential to be measured is applied. Electrometers can be constructed having full scale sensitivities ranging from several thousand volts to a volt or less. The response of the instrument is very nearly linear with voltage. The sensitivity decreases at a rate of the order of 1% or less per day because of charge leakage from the fiber. *Subject Heading:* **1. Electrometers.**—*Authors' abstract.*

INSTRUMENTS FOR MEASURING COMPOSITION OF THE ATMOSPHERE (551.508.95)

10L–556 551.508.95:551.577.7

*Flórián, Endre, **A légköri radioaktivitás mérésének egyes eredményeiről.** [Some results of atmospheric radioactivity measurements.] *Időjárás*, Budapest, 62(5):266–274, Sept./Oct. **1958.** 7 figs., 7 refs., eq. English summary p. 266. **DLC**—Radioactivity of precipitation has been measured during a long period by four stations and aerosol activity by one station of the Central Institute of Meteorology in Hungary. Some important data and monthly summaries are given by the author, comparing them also with measurements carried out abroad. Connections are found between the quantity and the activity of precipitation which help to determine the regional distribution of the activity. *Subject Headings:* **1. Radioactivity in precipitation 2. Hungary.**—*Author's abstract.*

10L–557 551.509.95:551.510.7

Fox, John G. and Sutton, Roger B., **Nucleonics instrumentation.** (In: Behar, M. F. de M. (*ed.*), **The handbook of measurement and control.** Pittsburgh, **1951.** p. 283–288. 2 tables). **DWB**—A useful systematic review of properties and instrumentation of nuclear radiation (α and β particles, γ rays, neutrons and other heavy particles). Principal features of circuits are summarized and prime detectors are classified. Includes also remarks on electrostatic precipitation of dust from air, radioactive gases and air, etc. *Subject Headings:* **1. Nucleonics instrumentation 2. Radioactivity in the atmosphere.**—*A.A.*

10L–558 551.508.95:551.510.41:546.264

Jenkinson, Robert Edward, **Theory of selective detectors for use in infrared gas analyzers.** Ohio. State Univ. Research Foundation, Contract AF 19(122)-13, Scientific Report, No. 3, **1954.** 115 p. 26 figs., 4 tables, eqs. **DWB**—Investigations to develop a selective, pneumatic infrared detector for measuring CO_2 concentration in earth's atmosphere from surface to 100,000 ft. (attached to balloon) and to telemeter data to ground observer. Most of the report is concerned with the design and performance of the detector cell, nonselective as well as selective though the latter is the instrument developed for CO_2+N_2O use. Model described and illustrated. *Subject Headings:* **1. Infrared gas detectors 2. Carbon dioxide measurement instruments.**—*M.R.*

10L–559 551.508.95:551.510.71

Miranda, Henry A., Jr., (*Physics Dept., Fordham Univ.*), **On the de-emanation of a radium solution.** *Journal of Atmospheric and Terrestrial Physics*, London, 12(1):80–83, **1958.** fig., table, 7 refs., 5 eqs. **DLC**—Low level radon determinations are applied in a variety of fields of study. These include large volume water flow measurements, large scale uranium prospecting and meteorological studies of air mass movements. The author has recently developed an improved technique for measuring the radon content of the atmosphere, employing coconut charcoal as a concentrating agent. *Subject Heading:* **1. Radon measurement techniques.**—*N.N.*

10L–560 551.508.95:546.22:551.510.41

Perley, G. A. and Langsdorf, B. F. T., (*Leeds and Northrup Co., Philadelphic, Pa.*). **Problems in the recording of SO_2 in polluted atmospheres.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air Pollution: proceedings. 1952.** p. 556-566, figs., refs.) **DLC** (TD887.U5)—A description of the design, construction and operation of the autometer which is a single unit adaptation of the "field sulfur dioxide autometer" made available by the Leeds and Northrup Co. Its field application is described. *Subject Headings:* **1. Autometers 2. Sulfur dioxide in the atmosphere.**—*I.L.D.*

10L–561 551.511:551.508.95:551.510.3

Tardos, Béla, **A termikus feláramlásokról.** [Thermal ascending currents.] *Idojárás*, Budapest, 58(5):283–288, Sept./Oct. **1954.** 4 figs., 7 eqs. **DWB**—Starting from an energy equation a formula is deduced for the adiabatic gradient, in which kinetic energy is also considered. The development of an air density recorder is reported. The purpose of this instrument is to record surface air density changes preceding updrafts. It records density changes of 1 g/m^3 with an amplitude of 1 mm. The instrument may also be used for recording turbulence. *Subject Heading:* **1. Air density recorders.**—*Transl. of author's abstract.*

10L–562 551.508.95:546.22:551.510.41

Thomas, Moyer D. and Ivie, James O. (*American Smelting and Refining Co., Salt Lake City*). **Automatic apparatus for the determination of small concentrations of sulfur dioxide and other contaminants in the atmosphere.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C., 1950, **Air Pollution; proceedings. 1952.** p. 567–579. figs., tables, refs.) **DLC** (TD887.U5)—A review of the automatic and portable apparatus for determining concentrations of sulfur dioxide and other gases and aerosols in the atmosphere, used by the American Smelting and Refining Co. Photographs and diagrams of each type of apparatus are given and the advantages and disadvantages of each type for particular purposes are cited. *Subject Headings:* **1. Atmospheric pollution measurement instruments 2. Sulfur dioxide in the atmosphere.**—*I.L.D.*

10L–563 551.508.95:546.22:551.510.41

Tomberg, V., **Über eine neue Methode der Messung sehr kleiner Mengen von CO in Luft, Blut und Lunge.** [On a new method of measuring very small amounts of CO in air, blood and lungs.] *Experientia*, 10(9):388–389, Sept. 15, **1954.** 2 figs., 4 refs. English summary p. 389. **DWB**—The method is to heat HgO to 200°C in a reaction chamber, where it reacts with CO to release mercury vapor. This is measured in a UV spectrometer to 1 pt per 100 million air. Diagram of a portable apparatus is given. *Subject Headings:* **1. Air sampling and analysis 2. Carbon monoxide measurement techniques.**—*C.E.P.B.*

INSTRUMENTS OF SPECTROMETER TYPE FOR MEASURING ATMOSPHERIC STRUCTURE (551.508.953)

10L–564 523.77:551.508.953

Blave, A. and Grad, F., **L'enregistrement automatique au spectrographe.** [Automatic recording means of the β spectrograph.] *Electronique, télécommunications, électricité* (*Revue H F*), Brussels ssels 4(3):43-51, **1958.** 21 figs., 5 refs.—The authors point out the necessity of feeding with very ble dc the exciting coil of the double focusing β spectrograph, as well as interest in equipping this rument with a device permitting the automatic recording of the line spectra. Both of these aratus have been built and present the following main features: current adjustable from 5 to mA for a stability equal to 10^{-4}; possibility of recording a maximum of 1200 points without nual intervention, the intervals between successive points being adjustable. *Subject Headings:* **spectrographs 2. Automatic recording of line spectra.**—*A.V.*

10L–565 551.508.953:551.510.62:551.521.3:535.33

†Boudouris, Georges, (*Lab. of Atmospheric Phys., Fac. of Sci., Paris*), **Sur l'indice de refraction l'air, l'absorption et la dispersion des ondes centimetriques par les gaz [I].** Refractive index air, absorption and dispersion of centimetric waves by gases [Pt. 1].] *Journal Scientifique la Météorologie*, Paris, 10(39):91-113, July/Sept. **1958.** 14 figs., 11 refs., eqs. French, English Spanish summaries p. 91–92. *Ibid.*, Pt. 2, *Journal de Mécanique et de Physique de l'Atmosphère*, is, Ser. 2, 1(2):49–80, April/June **1959.** 6 figs., 2 tables, eqs., bibliog. p. 77–80. French, glish and Spanish summaries. **DWB**—Pt. 1 of this article summarizes the principal present day ories concerning refractive index, absorption and dispersion. The molecular interpretation of dielectric properties of a gaseous medium is given with a recall of the Clausius-Mosotti law, the bye-Langevin relation and the nonresonant absorption theory. The ideas on refractive index, orption and normal dispersion are clearly explained. The author analyzes and discusses parlarly the essential aspects of the Van Vleck-Weisskopf theory currently used for explaining the orption and dispersion due to molecular resonances. Experimental checking corroborates the idity of this theory and the VAN VLECK-WEISSKOPF formulas still remain the fundamental theoical instrument. Pt. 2 gives the results of measurements of the refractive index of atmospheric es, water vapor and air. The analysis of these data leads to a conclusion in favor of the definitive nting of the relation $(n-1)\cdot 10^6 = 103.5(p_a/T) + 96(p_w/T) + 5\cdot 10^5(p_w/T^2)$ which enables the nputation of the refractive index of atmospheric air as far as its hygrometric degree is known. In above mentioned relation T = the temperature, p_a and p_w = the partial pressures of dry air and of ter vapor. *Subject Headings:* **1. Refractive index measurement techniques 2. Spectrometers Radio wave scattering 4. Van Vleck-Weisskopf theory.**—*A.V.*

10L–566 535.33:551.508.953

†Chabbal, Robert, **Recherches expérimentales et théoriques sur la généralisation de l'emploi du ectromètre Fabry-Pérot aux divers domaines de la spectroscopie.** [Experimental and theoretical dies on extending the use of the Fabry-Pérot spectrometer in various fields of spectroscopy.] *vue d'Optique*, Paris, 37(2):49–103, Feb. **1958**: 37(7):336–370, July **1958** and 37(10/11):501–551 t./Nov. **1958.** 87 figs., 41 refs. French and English summaries. **DLC**—The Fabry-Pérot specmeter has considerably higher luminosity (light gathering power) than a prism or grating specmeter at the same resolution; moreover its theoretical resolving power is not limited. In order make a "spectromètre intégral," that is to say, one capable of studying any arbitrary spectrum in vide spectral range, it is necessary to add, on the one hand, a monochromator to isolate one of the ss bands of the Fabry-Pérot, and on the other, a device permitting continuous exploration of a ge number of free spectral intervals of the Fabry-Pérot. The transformation of a Fabry-Pérot ectrometer into a "spectromètre intégral" is investigated in a systematic way, the chosen criteria ing the luminosity, and the elimination of parasitic radiation. In general, the best solution is to t in series a grating monochromator and two Fabry-Pérot. The area of the Fabry-Pérot permitted maximum separation, the width, the "finesse globale," as well as other parameters are determined simple rules. It is possible to construct a "spectromètre intégral" using a Fabry-Pérot as the spersive element: this instrument has at all resolutions a luminosity 50–100 times superior to that a spectrometer using a grating of the same dimensions. These studies led to the construction of ree Fabry-Pérot spectrometers. The purpose of these spectrometers, their construction, the gain luminosity, or resolution, which they provided, as well as the details of construction, and the rification of proper operation of the optical and scanning system are described. *Subject Heading:* **Fabry-Pérot spectrometer.**—*From author's abstract.*

10L–567 535.853 551.508.953

Charpak, G. and Suzor, F., (*Lab. of Atomic Synthesis, C.N.R.S.*), **Spectrométrie nucléaire par mpteurs proportionnels en coincidence.** [Nuclear spectrometry through proportional counters in

coincidence.] *Journal de Physique et le Radium*, Paris, 19 (Supp. to No. 12):167A–170A, Dec. 19
5 figs., 4 refs. French and English summaries p. 167A. **DLC**—Description of a proportio
counter spectrometer specially adapted to the study of low energy radiations (electrons or phot
below 20 kev) emitted by radioactive atoms with very small probability. Two proportional coun
of 18 cm diameter are in contact along a plane which contains the source holder. The source i
direct contact with the gas of one of the counters. Impulses of this counter in coincidence v
impulses of the other are analyzed by a multi-channel analyzer. The associated electronic
described with particular emphasis on the problems of non-overloading qualities of the amplifi
Subject Headings: **1. Nuclear spectrometry 2. Proportional counter spectrometers 3. Electro
installation.**—*Authors' abstract.*

10L–568 551.508.953:551.59

Deloupy, C., Vergnoux, A. M. and Rouquayrol, F., **Caractéristiques d'un spectromètre int
rouge à prismes et à réseaux.** [Characteristics of an infrared spectrometer with prisms and gr
ings.] *Revue d'Optique*, Paris, 37(3):113–130, March **1958.** 9 figs., 11 refs. **DLC**—The perfo
ances of an infrared spectrometer with prisms and gratings designs, especially intended for crys
studies, are examined. Discussion is given on the following qualities: brightness, resolution a
spectral range of the instrument, with special attention on the grating mounting, using Finkelstei
system. Some examples show the potentiality of various utilizations: measurements of transmiss
and reflexion in polarized light, with simple or multiple beam, birefringences, studies of crystals
very different sizes and at low temperatures. *Subject Headings:* **1. Grating spectrometers 2. R
flection in polarized light.**—*Authors' abstract.*

10L–569 551.508.953:551.59

Dollfus, A., **Filtre polarisant lumineux pour l'observation de la couronne solaire, des auro
et de la luminescence de la haute atmosphère.** [Luminous polarizing filter for observation of so
corona, Polar auroras and luminescence of the high atmosphere.] *Académie des Sciences, Pa
Comptes rendus*, 245(1):32–35, July 1, **1957.** 8 refs. **DLC**—Description of a new polarizing fil
which permits the isolation of many of the main radiations emitted by Polar auroras, high terrestr
atmosphere and solar corona. Thanks to the entrance surface of 36×36 mm, the reduced number
five polarizers and the aperture of 12° for the pencil, it collects an important luminous flux on the s
surface. *Subject Headings:* **1. Astrophysics 2. Solar coronas 3. Luminescence observati
instruments 4. Aurora borealis observation instruments.**—*A.V.*

10L–570 551.508.953:551.521.3

Dufay, Maurice, **Description d'un spectromètre photoélectrique destiné à l'étude du spectre
ciel nocturne dans le proche infrarouge.** [Description of a photo-electric spectrometer designed
studying the spectrum of the night sky in the near infrared.] *Revue d'Optique, Paris*, 37(9):467–4
Sept. **1958.** 3 figs. 9 refs. **DLC**—Description of the construction and functioning of a photoelect
spectrometer designed for studying the spectrum of the night sky, the sky at twilight and the auro
between 0.7 and 1.1μ. The author gives the optical diagram of the monochromator, a descripti
of the photoelectric receiver, the condenser, the feeding and the recording device. He specifies t
functioning conditions, describes the gaging and gives indications about the results obtained. *Subj
Headings:* **1. Photoelectric spectrometers 2. Airglow spectrum 3. Auroras.**—*A.V.*

10L–571 523.77 551.508.9

Geake, J. E. and Wilcock, W. L., **Exploration de raies spectrales stellaires en inclinant
interféromètre Fabry-Pérot.** [Exploration of spectral stellar lines inclining a Fabry-Pérot int
ferometer.] *Journal de Physique et le Radium*, Paris, 19(3):346–350, March **1958.** 4 figs., 2 re
French and English summaries p. 346. **DLC**—Tests are described of an arrangement for the dire
photoelectric recording of stellar spectra, using a Fabry-Pérot interferometer in combination with
prism monochromator. The addition of the interferometer allows the monochromator to be us
with a wider entrance slit for given wave length resolution: this results not only in a gain of light, b
also in a reduction of the fluctuations caused by the motion of the stellar image under the influence
atmospheric turbulence. *Subject Headings:* **1. Fabry-Pérot interferometer 2. Stellar spect
3. Scintillation.**—*Authors' abstract.*

10L–572 551.508.953:551.521

Goulden, J. D. S. (*Nottingham*), **The use of diffraction gratings with an infra-red spectromet
Journal of Scientific Instruments, London, 29(7):215–216, July **1952.** 3 figs., 4 refs. **DWB**—Pla
replica grating with 2904 lines/in. gave a high dispersion with an infrared spectrometer in the 3
region, where the radiation output of the Nernst filament is too high. Unwanted spectral ord
(1.5μ) are separated by a pre-monochromator unit using the rock salt prism of the spectromet
Final resolving power is 1500. Measured absorption bands of atmospheric water-carbon dioxide a

vn for the 2.53 to 2.89 m region. *Subject Headings:* **1. Infrared spectrometers 2. Carbon ide absorption.**—*A.A.*

10L–573 535.51 551.508.953:551.521.18

Hadni, A.; Décamps, E. and Delorme, P., **Polarisation de la lumière 100μ et 300μ par les aux "échelettes."** [Polarizing of light between 100μ and 300μ by the "rack" diffraction grat-..] *Journal de Physique et le Radium*, Paris, 19(10):793–794, Oct. **1958.** 3 refs. **DLC**—nments on the use of a "rack" diffraction grating as a filter in a grating spectrometer for far ared. *Subject Headings:* **1. Polarization 2. Grating spectrometers 3. Infrared spectrometers.** ..*V.*

10L–574 551.508.953

Lassettre, Edwin N.; Silverman, Sam and Krasnow, Marvin E., **Further developments in the ory and use of the electron spectrometer.** Ohio. State Univ. Research Foundation, Columbus, tract AF 19(122)-642, Scientific Report, No. 11, July **1957.** 21 p. fig., 6 tables, 3 refs., 27 eqs.—s paper supplements two earlier reports on theoretical and practical performance of the instru-t, and confirms the validity of the procedure pursued. Here is given a detailed treatment of the ssure dependency of the scattering. Systematic errors in pressure measurements have no in-nce when the pressure gage is independent of the nature of the gas whose pressure is to be deter-ed. The F. E. D. is given here. *Subject Heading:* **1. Electron spectrometers.**—*W.N.*

10L–575 551.508.953:551.594.51:535.33

Lebedinskii, A. I. (*Univ. of Moscow*), **A slitless spectrograph designed to photograph the spectra aurorae.** (In: **The airglow and the aurorae: a symposium.** London, Pergamon, **1956.** p. 388–.. 8 figs. (photos), 2 refs.) **DWB**—The design of a slitless spectrograph is described, and the antages of such an instrument are discussed and illustrated by observations on auroras. *Subject idings:* **1. Slitless spectrographs 2. Auroral spectrograms.**—*Author's abstract.*

10L–576 523.77 551.508.953

Legay, F. and Barchewitz, P., **Mesure des indices de réfraction des gaz en infra-rouge à l'aide n interféromètre de Michelson.** (Measurements of refraction indices of gases in infrared with helson interferometer.) *Journal de Physique et le Radium*, Paris, 19(3):433–434, March **1958.** fs. French and English summaries p. 433. **DLC**—A Michelson interferometer, coupled with a ting spectrograph, is used in the infrared, from 1 to 5μ, to measure refractive indices of gases. e device was specially designed for dispersion measurements near vibration-rotation lines. Differ-methods have been used: 1) Absolute index measurements, at a fixed wave length, by varying the ssure in the gas chamber. 2) Dispersion measurements by channeled spectrum method, at a en pressure. 3) Measurement of index ratio, by recording the beats in the fringes arising from o different grating orders. Without any pressure or temperature measurement, the ratio may be asured with high accuracy. The effect of the resolving power is briefly discussed and typical asurements on HCl and air are given. Accuracy is improved by using the rotation of a compen-or plate to measure fractional orders. *Subject Headings:* **1. Michelson interferometer 2. Refrac-e index of gases.**—*Authors' abstract.*

10L–577 551.508.953:535.33

Namioka, Takeshi, **Construction of a grating spectrometer.** *Tokyo. Univ. of Education, stitute for Optical Research, Science of Light*, 3(1):15–24, August **1954.** 9 figs., 6 refs., eqs. **DWB**—15,000 line per in., 54 cm grating spectrometer based on the Seya mounting is described, which is signed to simplify the mechanism of wavelength change, to provide for automatic scanning, photo-ctric and photographic measurements, and which lends itself to reconstruction for use as 1 or 3 m tings. The entrance and exit slits are fixed; the grating rotates about a vertical axis through the ter of the grating and different wave lengths are obtained in good focus over a wide range simply this rotation of the grating. As the instrument now stands the wave length limit on the long side, posed by the response of the 1P21 multiplier phototube, is 6200 Å but if for instance a PbS cell re used as detector, this limit should be raised to about 1.4μ. The applicable area of the ruled face of the grating remains constant during the rotation of the grating, and so no diminution of e resolving power of the spectrum occurs throughout the whole wide range. *Subject Headings:* **Grating spectrometers 2. Photographic measurement.**—*Author's abstract.*

10L–578 551.508.953:551.521.18:535.33

Palmer, C. Harvey, Jr., (*Johns Hopkins Univ., Md.*), **Diffraction grating anomalies, Pt. 2, arse gratings.** *Optical Society of America, N. Y., Journal*, 46(1):50–53, Jan. **1955.** 3 figs., ables, 6 refs., eqs. **DWB, DLC**—A preliminary study of the anomalies for coarse infrared reflec-n gratings ($d = 10.5\mu$) in the visible reveals the presence of many extremely strong anomalies for

both the S and P polarization. The anomalies correspond, in some cases, to passing off orde high as 42. Within experimental error the positions of the anomalies are given by the Ray formula. The great strength of the P anomalies observed is in agreement with the author's e hypothesis that, unlike S anomalies, P anomalies can occur only when the depth of the rulir comparable to or greater than the wave length. A total of about six echelette gratings all sh extremely strong anomalies for both polarizations. *Subject Heading:* **1. Infrared spectroscop** *Author's abstract.*

10L–579 551.508.953:55

Romand, J. and Vodar, B., **Un spectrographe dans le vide pour l'analyse spectrochim d'émission dans l'ultraviolet lointain.** [A vacuum spectrograph for spectrochemical emi analysis in the far ultraviolet.] *Revue d'Optique*, Paris, 37(7):329–335, July **1958.** 3 figs., 10 **DLC**—The authors give a brief review of the difficulties encountered with the usual spectroche analysis methods for the detection of the elements having their sensitive lines in the far ultravi One of the solutions of this problem is provided by the use of the vacuum sliding spark spectrum, the authors describe an apparatus especially designed for this purpose. The main component vacuum grating spectrograph, which is useful for all spectral investigations in the range 500–290 *Subject Headings:* **1. Spectrographs 2. Spectrochemical emission analysis 3. Far ultraviol** *Transl. of authors' abstract.*

10L–580 535.33:551.508.953:551.52

Sergent, Michèle, **Etude expérimentale d'un spectrographe pour l'infrarouge lointain.** [Ex mental study of a spectrograph for the far infrared.] *Revue d'Optique*, Paris, 37(10/11):552– Oct./Nov. **1958.** 5 figs., 2 tables, 8 refs. French and English summaries. **DLC**—This pa describes a new spectrograph designed to operate in the far infrared. Special attention is to the various problems arising in this spectral region and to the way in which they were sol The study of the rotation spectrum of water vapor visualizes the performance of the instrum *Subject Headings:* **1. Spectrographs 2. Far infrared measurement techniques.**—*Author's abstra*

10L–581 551.508.953:535.33:551.52

Silvernail, C. J., **A fluorite spectrograph of high aperture.** California. University at Angeles. Institute of Geophysics, Contract AF 19(122)-453, Scientific Report No. 1, July 1, 1 6 p. 3 figs., table, refs. **DWB**—A spectrograph for laboratory investigations of weak spec sources as related to afterglows and other chemiluminescences of nitrogen, oxygen and gase mixtures important to upper atmosphere research is briefly described. Artificially grown fluo crystals (limiting size 5″) instead of quartz elements will be used for the study of the far ultravi region. Substituting different spherical mirrors, the spectrograph could be used also for the vis and infrared parts of the spectrum. The dispersion is 18 Å per mm in the third order ultravid *Subject Headings:* **1. Spectrographs 2. Ultraviolet region 3. Upper atmosphere research.**—*A.A*

10L–582 551.508.953:551.594

Strickler, Thomas D. and Wadey, Walter G. (*Yale Univ., New Haven, Conn.*), **An automa recording gamma-ray spectrometer.** *Review of Scientific Instruments*, 24(1):13–16, Jan. 19 6 figs., foot-refs. **DWB**—A scintillation spectrometer making use of a large NaI/TlI crystal moun on an RCA 5819 photomultiplier tube has been constructed. It was designed for the high efficie counting of gamma rays in the energy range 0.5–1.5 Mev. Techniques used for crystal mount and assembly of apparatus have proved very satisfactory for prolonged operation. Additio components have been provided for automatic recording of data. *Subject Heading:* **1. Gamma spectrometers.**—*Authors' abstract.*

10L–583 551.508.953:551.521.18:535

White, J. U.; Alpert, N. L. and DeBell, A. G., **Infrared grating spectrophotometer.** *Opt Society of America, Journal*, 47(5):358–367, May **1957.** 13 figs., table, 10 foot refs. **DWB, DL** A spectrometer that makes convenient the use of high resolution in infrared spectroscopy is describ With it, it is possible to resolve close to the theoretical for the largest gratings obtainable by using mosaics of gratings up to $1\frac{1}{2}\times14\frac{1}{2}$ in. in area. The instrument may be adapted to a wide rang problems by changing detectors, sources, gratings, prisms and windows and its range of operat conditions is very wide. The slit is varied automatically according to any preselected progr *Subject Headings:* **1. Grating spectrometers 2. Infrared spectroscopy.**—*N.N.*

10L–584 551.508.953:551.521.18:535

Yoshinaga, H.; Fujita, S.; Minami, S. et al. (*all, Osaka Univ., Japan*), **Far infrared spectrogr for use from the prism spectral region to about 1-mm wavelength.** *Optical Society of Amer Journal*, 48(5):315–323, May **1958.** 11 figs. (incl. photos), table, 34 foot-refs., eqs. **DLC**—A

red spectrograph is described. The mounting is of the CZERNY-TURNER type. The radiation es are a heated platinum strip used in the short wave region and a high pressure mercury lamp in the long wave region. Golay cells with diamond or quartz windows are used as detectors. ers for filters to eliminate short wave radiation and for reflection or transmission samples are ned for convenient use. Special chambers provide optical paths for long gas cells and provide rs for small solid samples. All parts of the optical system are in a vacuum tank and are remote rolled. Spectra are automatically recorded on a strip-chart recorder. Spectra in the region 18μ to about 1 mm, obtained with six echelette gratings, are shown. Reproducibility of wave- h settings is one pt in 5000. Resolution of better than 0.5 cm^{-1} throughout the entire spectral n has been achieved. *Subject Headings:* **1. Infrared spectrographs. I. Mitsuishi, R. A. II. Oet- R. A. III. Yamada, Y.**—*Authors' abstract.*

INSTRUMENTS FOR INVESTIGATING IONOSPHERE (AS PART OF THE ATMOSPHERIC STRUCTURE) (551.508.96)

10L–585 551.508.96:621.396.8

Bailey, D. K. (*Page Communications Engineers, Inc., Wash., D. C.*), **Effect of echo on the opera- of high-frequency communication circuits.** *Institute of Radio Engineers, N. Y. Professional up on Antennas and Propagation, Transactions*, Vol. AP-6, No. 4:325–329, Oct. **1958.** 7 figs., fs. **DLC**—Echo on high frequency communication services is defined as the simultaneous ption of signals over both major and minor arcs of the great circle connecting a transmitter and iver. Two distinct kinds of echo are recognized according to the illumination conditions under h they occur. Echo of the first kind is observed when the great circle path coincides with the ght zone surrounding the earth, whereas echo of the second kind, which can occur only on fairly communication paths, is most severe when the short path is most intensely illuminated. Little be done to obviate echo of the first kind and it is not, like echo of the second kind, amenable to liction by available methods of calculating sky wave field intensities. Radio traffic data are d which corroborate calculations and show both that echo of the second kind is more severe at s of maximum solar activity, and is less severe on higher frequencies. Conclusions are drawn erning mode of operation and choice of operating frequency to minimize echo interference. *ject Heading:* **1. Radar echoes.**—*Author's summary.*

10L–586 551.508.96

Banerjee, B. M. and Roy, R. (*Inst. of Nuclear Phys., Calcutta*), **High precision ionospheric nding equipment.** *Indian Journal of Physics*, Calcutta, 26(10):473–494, Oct. **1952.** 17 figs., es, refs. p. 490. **DLC**—An ionospheric sounding apparatus of high resolving power and uracy is described and its circuit diagrams are presented. It utilizes a transmitter generating K.W. sounding pulses of 6–30 sec duration, interchangeable receivers of 50–200 Kc/s bandwidth a 12-line raster time base to produce a greatly expanded presentation of the pulse echoes. A dy of the height measuring accuracy and resolving power of such instruments, in both ideal and ctical conditions, leading to interesting conclusions, is appended. *Subject Heading:* **1. Ionospheric orders.**—*Authors' abstract.*

10L–587 551.508.96:621.398

Best, Nolan R. (*U. S. Naval Research Lab.*), **AN/FKR-1( ) Telemetering ground station im- vement program.** *U. S. Naval Research Laboratory, Upper Atmosphere Research Report*, No. 15, y 26, **1952.** 22 p. 7 plates, 9 figs. **DWB**—After more than three years of use at White Sands ving Ground, the AN/FKR-1 ground station for the Matrix Telemetering System (AN/DKT-2) received general improvement as follows: (a) Improved monitor racks that incorporate new uit developments and superior mechanical design have been installed. (b) Additional recording ks, which allow three channels per scope or six channels per 9-in. film to be recorded, have been led. (c) Provision has been made in the ground station to allow interchangeable operation with Miniature Matrix Telemetering System, AN/DKT-7. (d) Record quality has been improved the dynamic focusing of recording cathode ray tubes and by the use of new optical equipment. *bject Headings:* **1. Telemetering systems 2. Rocket sondes.**—*NRL abstract.*

10L–588 551.508.96:551.510.535:621.396.8

Bowhill, S. A.; Bulman, G. R. P. and Mittra, R., **Instrumentation for the automatic observation high frequency ionospheric absorption.** Pennsylvania. State Univ. Ionosphere Research Lab., ntract AF 19(604)-1304, Scientific Report, No. 98, Dec. 1, **1957.** 47 p. 20 figs., 10 refs., 8 eqs. **VB** (M10.535 P514i)—This report deals with instrumentation developed to record automatically absorption of high frequency pulsed radio signals in the ionosphere. The observations are

currently being made using a visual method of recording. The automatic method has as its basi measurement of the mean power of the received signal. A slowly acting feedback loop adjust gain of the receiving equipment to keep the mean power constant. The gain control characte of the receiver permits the display of the absorption (in decibles) linearly on a pen recorder. plete descriptions of the various parts of the equipment are given, and preliminary results obta by the visual method are illustrated. *Subject Headings:* **1. Ionospheric absorption measure instruments 2. Ionospheric recorders.**—*Authors' abstract.*

10L–589 551.50

Clarke, C. and Shearman, E. D. R., **Automatic ionospheric height recorder.** *Wireless Engi* 30(9):211–222, Sept. **1953.** 11 figs., 3 tables, 4 refs. **DLC**—The paper describes comme equipment, based on a design by NAISMITH and BAILEY, for measuring the virtual height of reflec of ionospheric echoes as a function of transmitted frequency. A pulse transmitter consisting master oscillator and power amplifier is tuned through the frequency range in 5 bands. The rec is separately tuned and is kept in step with the transmitter by a frequency discriminator and se mechanism. The receiver output is presented on 2 cathode ray tubes, one for monitoring and for photographic recording, each displaying a linear time base sweep. Height and frequency brations, which are derived from a crystal source, are displayed, and a crystal controlled time sw is incorporated for the automatic operation of the equipment. *Subject Heading:* **1. Autom Ionospheric recorders.**—*Authors' abstract.*

10L–590 551.50

Cones, Harold N., **Effect of a metal mast and guy wires on the performance of the 600- multiple-wire delta antenna.** *U. S. National Bureau of Standards, Journal of Research,* 46(2): 120, Feb. **1951.** 7 figs. **DWB**—This report describes the results of measurements made to termine the effect of a metal mast and guy wires on the radiation pattern and the effect of guy w on the terminal impedance and the radiation efficiency of the 600-ohm multiple-wire delta ante Model techniques were used to obtain radiation patterns of identical antennas supported in var ways. Curves are presented showing the terminal impedance over the frequency range 1–25 of full scale antennas with or without guy wires. A graph of the quasiradiation efficiency of antenna as a function of frequency is shown. *Subject Headings:* **1. Multiple wire delta anten 2. Ionospheric sondes.**—*Author's abstract.*

10L–591 551.508.96:551.510.535:621.39

Davies, Kenneth (*Boulder Lab., National Bur. of Standards*), **The measurement of ionosph absorption using ionosondes.** *U. S. National Bureau of Standards, NBS Report* No. 5010, Aug. **1956.** 24 p. 6 figs., 4 tables, 15 eqs. **DWB**—The equipment described and illustrated is inten to determine changes in ionospheric absorption by measuring changes in the amplitude of reflec signals. Fading is neglected in the discussion of theory. The ionosondes are types C-2 and Automatic Ionospheric Recorders, adapted to measure at a fixed frequency. Techniques discus include measurement of reflection coefficient, relation to absorption, choice of frequency, calibrat of equipment, calculations of absorption (L), sampling of amplitude measurements, tabulation data, etc. *Subject Headings:* **1. Ionosondes 2. Ionospheric absorption measurement techniq** —*M.R.*

10L–592 551.508

Grisius, Nicolas, **L'Enregistreur ionospherique de Léopoldville.** [Ionospheric recorder Leopoldville.] *Belgian Congo. Service Météorologique, Bulletin Mensuel,* No. 1:9–23, Jan. **19** 13 figs. (incl. port.). In French; French, Dutch, English and German summaries p. 9. **DWB** The instrument is a modification of an entirely automatic ionospheric recorder covering the ra of frequencies from 0.1–20 Mc/s. Calibration points for frequencies and heights are recorded on same cathode ray picture as the curve during the 7 sec of the sweep, thus affording an immedi and accurate reading of the height of reflection vs. the frequency. This complete picture is pho graphed every 20 min or every min with a 16 mm camera. The details of the original recorder described by T. L. WADLEY in a publication (1947) of the South African Council for Scientific Industrial Research under the title: **A single band ionosphere recorder covering the range 0.1 20 Mc/sec.** Records and installation at Leopoldville are included with the specifications suppl by WADLEY.—*Subject Headings:* **1. Automatic ionospheric recorders 2. Leopoldville, Congo public.**—*Author's abstract and M.R.*

10L–593 551.508

Automatic ionosphere recorder. *Journal of Geophysical Research,* Wash., D. C., 61(1): March **1956. DLC**—A Model C-4 ionosphere recorder for IGY networks, now being produce

antity by Barker and Williamson, Upper Darby, Penn. for Bureau of Standards, is described. It transceiver type radar set consisting of a pulse transmitter, pulse receiver, clock programming, play and recording system, with a sweep from 1–25 mc with 50 microsecond pulses, and is auto-ic. It can also be used for oblique incidence back scatter studies. It costs $32,500. *Subject ading:* **1. Automatic ionospheric recorders.**—*M.R.*

10L–594 551.508.96

Ionospheric research station: Physical Research Laboratory, Ahmedabad. *Journal of Scientific & Industrial Research*, 12A(5):220–223, May **1953.** 5 figs. **DWB**—Technical details of the new multi-frequency automatic ionospheric recorder installed at Ahmedabad, India are given. Photographs of the crossed vertical rhombic aerials, of the Nat. Phys. Lab. (Teddington) recorder (front and side view) and of sample records are presented. The apparatus operates in the frequency range 1–25 Mc divided into five bands. The station coordinates are 23°02′N, 72°38′E (geog.) and 13.6°N, 6°E (geom.). *Subject Headings:* **1. Automatic ionospheric recorders 2. Physical Research Lab., Ahmedabad, India.**—*G.T.*

10L–595 551.508.96

Pitts, John J. and Gladden, Sanford C., **Cause and correction of some malfunctions of C-2 and C-3 ionosondes.** *U. S. National Bureau of Standards, NBS Report* 5517, Oct. 15, **1957.** 31 p. figs. **DWB** (M10.535 U585ca)—Four categories of ionosonde malfunction are treated in this communication. Ionogram appearances for many points are given, and explanations offered for the various malfunctions. Suggestions for the correction of the situation are included for each ionogram appearance. *Subject Headings:* **1. Ionospheric sondes 2. Ionograms.**—*N.N.*

10L–596 551.508.96

Jones, Robert E., **Instrumentation for the measurement of change in phase height at 150 kc/s and six months of initial data.** Pennsylvania. State College. Ionosphere Research Laboratory, Contract AF19(122)-44, Scientific Report, No. 41, Aug. 15, **1952.** 58 p. 31 figs., table, 11 refs. **DWB**—The so-called "radio-interferometer" has a memory circuit that "remembers" the phase of a transmitted signal whose echo is then compared on a cathode ray oscilloscope for continuous photographic recording. The instrument which has been used in the study of the lower part of the E-region of about 3000 electrons/cm^3, is described in some detail in block and schematic diagrams and photos. Characteristics of the instruments are: (1) Under favorable ionospheric conditions, the phase can be measured to one quarter wavelength. (2) Under otherwise favorable conditions, the change in phase height of either two overlapping echoes may be measured independently, whereas measurements over an extended period of time when very sudden changes of phase, or practically complete interference between the echoes occurs, are problematic. (3) Full 24-hr record with no discontinuities is slight, but the good continuity during sunrise drop might prove advantageous in the contemplated studies of sunrise effect and lunar tides. With some modifications and suggested improvements it might be used in the study of ionospheric winds as well, a project in the blueprint stage. Excerpts of unprepared data and six months summary are presented. *Subject Headings:* **1. E layer 2. Ionospheric recorders 3. Radio interferometers.**—*W.N.*

10L–597 551.508.96

Jones, Robert E. (*Penna. State Col.*), **Instrumentation for measuring changes in phase of ionospheric echoes.** *Review of Scientific Instruments*, 24(6):433–436, June **1953.** 3 figs., refs. **DWB**—A method is described for detecting changes in the phase under the envelope of radio pulse echoes reflected from the ionosphere and for making a continuous record of the variations of this phase with time. The system is essentially a frequency converter, radio frequency interferometer, and recorder. *Subject Headings:* **1. Ionospheric recorders 2. Radio interferometers.**—*Author's abstract.*

10L–598 551.508.96

Kissinger, R. W. and Van Meter, D. (*Pa. St. Coll. Ionos. Res. Lab.*), **Delay and synchronizing pulse generator.** Pennsylvania. State College. Ionosphere Research Laboratory, Contract AF 19(122)-44, Basic Ionospheric Research, Technical Report, No. 26, Sept. 1, **1951.** 21 p. 10 figs., refs. **DWB**—Brief discussion of the theory and the operation of the delay synchronizing pulse generator in use at Pennsylvania State Laboratory. Schematic diagrams and photographic examples of the video pulse signal before and after passing through the delay unit are presented. *Subject Heading:* **1. Ionospheric recorders.**—*W.N.*

10L–599 551.508.96:621.398

Mengel, John T. (*Naval Res. Lab., Washington, D. C.*), **Long range multi channel telemetering system.** *Instruments*, Pittsburgh, 23(1):70–72, Jan. **1950.** 5 figs. **DLC**—The "Matrix Telemeter-

ing System" developed at the Naval Research Laboratory for transmitting upper air data ov distance of up to 500 mi is described. The apparatus consists of a transmitting set and a gr station. It operates over 30 input channels at the rate of 312.5 samples per sec per channel, wi minimum accuracy of ±1%. Photographs and block diagrams of the units and a sample re are presented. This is the second system of its kind put into use at White Sands Proving Gro *Subject Headings:* **1. Telemetering systems 2. Recording equipment 3. Upper air data transmiss** —*G.T.*

10L–600 551.50

Nakata, Yoshiaki; Kan, Miyao and Uyeda, Hiroyuki (*Radio Res. Lab., Tokyo*), **Sweep-frequency *h't* measurement of the ionosphere.** *Japan. Science Council. Ionosphere Research C mittee, Report of Ionosphere in Japan,* 7(1):1–6, **1953.** 7 figs., ref. **DWB**—Equipment for c tinuous recording of the *H'* variation of the ionosphere was constructed. At first the method adop is briefly described, and then a few typical examples of the records are illustrated. Further discuss will be developed later in detail. *Subject Heading:* **1. Ionospheric recorders.**—*Authors' abstract.*

10L–601 551.508

*Parkinson, R. W., **Instrumentation for the measurement of coupling phenomena at 150 kc/s preliminary results.** Pennsylvania. State College. Ionosphere Research Laboratory, Contr AF 19(122)-44, Scientific Report No. 47, Aug. 10, **1953.** 57 p. 28 figs., 14 refs., 14 eqs. **DWI** A method is outlined which is designed to permit detailed investigation of coupling phenome using pulsed 150 kc/s radio signals vertically incident upon the ionosphere. The equipment described in detail, and circuit diagrams and photographs are shown. Essentially, the syst resolves elliptically polarized echoes into circularly polarized components and their vector sum a continuously records the amplitudes of these parameters. A time varied intensity modulation g selects the desired echoes and resolves split echoes with respect to height. Sample records presented and a summary of preliminary results on the diurnal characteristics of both main a coupling echoes is given in graphical form. Examples of continuous results obtained over sh periods of time are included. It is concluded that the method is practical and satisfactorily fulf the purpose for which it was intended. *Subject Heading:* **1. Ionospheric recorders.**—*Autho abstract.*

10L–602 551.508.96:621.3

Passow, Robert L. (*Pa. St Coll. Ionosphere Res. Lab.*), **The design, construction and operati of a two megawatt long-wave pulse transmitter.** Pennsylvania. State College. Ionospho Research Laboratory, Contract AF 19(122)-44, Ionospheric Research, Scientific Report, No. June 30, **1952.** 121 p. 47 figs., eqs. **DWB**—This work is concerned with the ionosphere soundi transmitting equipment developed for use in the program of upper atmosphere investigations bei carried on at the Laboratory. The design problems and their solutions are discussed and the equi ment developed is described in detail as to design, construction and testing procedures with the maj emphasis placed on the 150 kc/s 2.0 megawatt pulsed sounding transmitter. *Subject Heading* **1. Ionospheric recorders 2. Upper atmosphere research 3. Radio wave propagation.**—*Autho abstract.*

10L–603 551.508.

Saha, A. K. and Ray, S. (*both, Inst. of Radio Physics & Electronics, Calcutta*), **Some features the automatic P'-f records obtained at Ionosphere Field Station, Haringhata.** *Science and Cultur* Calcutta, 21(2):111–113, Aug. **1955.** 5 figs. **DLC**—The automatic ionospheric recorder presente to Calcutta University by the Commonwealth Scientific and Industrial Research Organization Australia, was installed in late 1954 at the Ionospheric Field Station, Haringhata (22°56'N, 88°31'E 28 mi NNE of Calcutta. The recorder has a frequency sweep of 1–13 Mc/s in 1 min 5 sec, co tinuously or at intervals of 10 min. P'-f traces were recorded automatically since Dec. 1954. Typ ical daytime and nighttime records, and annual (diffuse F region and double F layer) nighttim records are reproduced and discussed. *Subject Headings:* **1. Ionospheric recorders 2. Calcut Ionospheric Observatory, India.**—*M.R.*

10L–604 551.508.9

Sarkar, H. (*Banaras Hindu Univ.*), **A linear time-base circuit for ionospheric investigation** *Journal of Scientific and Industrial Research,* New Delhi, Sec. B, 15(5):217–221, May **1956.** 6 figs 3 refs., 32 eqs. **DWB, DLC**—A linear time base circuit for ionospheric investigations, consisting a RC network with a thyratron valve, has been studied with the help of transformation calculus It has been found that the linearity of such a circuit is considerably increased by using more tha one network. The theoretical deductions have been verified with single, double and triple R

tworks consisting of similar elements. The results have been verified experimentally with a thode ray oscillograph. *Subject Heading:* **1. Ionospheric recorders.**—*Author's abstract.*

10L–605 551.508.96

*Schrag, R. L., **Instrumentation for the observation of long delay echoes at 150 kc/s.** Pennsylnia. State College. Ionosphere Research Laboratory, Contract AF 19(122)-44, Scientific Report o. 50, Sept. 25, **1953.** 87 p. 38 figs., 10 refs.—Instrumentation capable of searching for long delay hoes at 150 kc/s is fully described. Several polarized receiving schemes, attempted in an effort separate echoes with isolated reflecting mechanisms from the normal E-hop system of echoes, are scussed. The right and left handed circular reception schemes were the most successful. Data e recorded by two standard techniques, both recording schemes possessing ranges normally extendg to 1500 km or more. Several examples of received long delay echoes are presented. The strumentation has recently been adapted for accurate multiple hop analysis, in terms of both nplitude and polarization considerations. *Subject Heading:* **1. Ionospheric recorders.**—*From uthor's abstract.*

10L–606 551.508.96

U. S. National Bureau of Standards, **A low-frequency ionosphere recorder.** *Its Technical ews Bulletin*, 37(4):60–62, April **1953.** illus., ref. Also in: *Navigation*, 3(9):340–343, Sept. **1953.** WB—In order to study ionospheric conditions affecting low frequency (long wave) radio propagaon, the Bureau of Standards has developed a vertical beam and recorder which operates at freuencies of 50–1100 kc by use of the beat frequency method. Heretofore efforts have been conntrated on high frequency propagation so that little is known about ionospheric phenomena below Mc. This information is becoming necessary for new kinds of radio navigation and location ystems using both the pulse and phase schemes. Also these frequencies are more reliable. The ntire system is described in detail and a record of virtual height vs. frequency shows areas of reflecon at 100, 120 and 200 km, respectively, depending on frequency. *Subject Headings:* **1. Ionospheric ecorders 2. Long wave radio propagation.**—*M.R.*

INSTRUMENTS FOR MEASURING COOLING POWER AND HEAT LOSS (551.508.98)

10L–607 551.508.98

Goldschmidt, Johannes, **Abkühlungsgrösse und Effektivstrahlung.** [Cooling power and ffective radiation.] *Zeitschrift für Meteorologie*, 6(11):321–335, Nov. **1952.** 6 figs., 6 tables, 20 efs.—A comprehensive review of the experiments and of the measurements obtained with the Davos rigorimeter at the Wahnsdorf Observatory since its installation in 1925. The various uses of frigorietric measurements, namely: (1) the utilization of the cooling magnitude as a climatic index, 2) the determination of the meteorological components of the cooling magnitude and the long wave adiation of the atmosphere, and (3) the relationship between cooling magnitude and the heat alance of the human body, are reviewed briefly. The major part of this paper includes a complete ccount of the theoretical basis of the Davos frigorimeter; instrumental difficulties encountered in its se; methods of automatic recording of various measurements made at Wahnsdorf and the evaluation f the suitability of this instrument for measuring radiation; the calculation of effective radiation o the sky and ground from cooling values; and various suggestions for improving the method of neasurement. *Subject Headings:* **1. Davos frigorimeter 2. Cooling power measurement techniques . Wahnsdorf Observatory, Germany.**—*I.L.D.*

10L–608 551.508.98 551.586:612.5

Riedel, G. (*Germany*), **Das Messen von Hitzebelastungen mit einer Klimasonde.** [Measurement of heat loads with a climate sonde.] *International Journal of Bioclimatology and Biometeorology*, Leiden, Vol. 1 (Pt. 4, Human Bioclimatology), **1957.** 3 p. 4 figs.—A description, with the id of a diagram, is given of a device which is capable of measuring the heat load of an ambient tmosphere upon an individual. It reproduces the situation of heat loss from the human skin when t is covered with sweat at high temperatures. It consists of a hollow sphere of a porous substance which is connected by means of a column to a water reservoir and is always filled with water by neans of a pump. Before a measurement is made the water is heated and kept at a constant temperature during the measurement. The interior temperature is determined with a mercury thermometer while the surface temperature of the sphere is determined from the thermoelectrical temperature difference between the inner and outer wall of the sphere. This device exaggerates evaporative heat loss. The conversion of the temperature measurements into effective temperature is illustrated on a diagram. *Subject Headings:* **1. Heat loss 2. Climate sondes.**—*I.L.D.*

OTHER INSTRUMENTS (551.508.99)

10L–609 551.508.99:551.594

Alaska. Univ. Geophysical Institute, **Construction of all-sky cameras. Quarterly Progre Reports No. 1–7,** March 1–Oct. **1957,** on IGY Project No. 1.1; NSF Grant No. Y/1.1/44. 3 piec **DWB** (M:7713 A323con)—This report announces the completion of the 29 all-sky cameras to l used in the U. S. program during the International Geophysical Year. The final design of th instrument was modified to conform with that constructed by W. STOFFREGEN of Uppsala, Swede The contract was awarded to Photo-Mechanisms, Inc., Huntington Station, N. Y., on Jan. 27, 195 Names of the locations of these cameras, and the number allocated for each strategic point are cit in this paper. Tests conducted with these cameras gave good results. *Subject Heading:* **1. All-sk auroral cameras.**—*N.N.*

10L–610 551.508.9

Bromley, Le Roy A.; Edwards, Russell K. and McKisson, Raleigh L. (*Univ. of Californi Berkeley*), **Sodium pump for purification of inert atmospheres.** *Review of Scientific Instrument* Lancaster, 23(7):342–344, July **1952.** fig., table, 5 refs. **DLC**—A liquid sodium pump and con tacting tray are described and recommended for the removal of oxidizing gases from inert atmosphe working chambers. The inert gas is circulated over streams of molten sodium on the contactin tray. With this apparatus it is easy to obtain an atmosphere whose reactivity is less than the be vacuum in which comparable manipulations may be accomplished. *Subject Headings:* **1. Atmos pheric analysis equipment 2. Air purification equipment.**—*Authors' abstract.*

10L–611 551.508.99:535.322:538.56:551.510.6

Bussey, Howard E. and Birnbaum, George, **Measurement of variations in atmospheric re fractive index with an airborne microwave refractometer.** *U. S. National Bureau of Standard Journal of Research,* 51(4):171–178, Oct. **1953.** 7 figs., 2 tables, 16 refs.—A microwave refractomete for aircraft use is described, and some of the sources of error in the measurement of variations o atmospheric refractive index with this instrument are discussed. Observations were made up t 10,000 ft on q days near Washington, D. C. Two refractive index soundings taken 1½ hrs apar showed changes that, in the coarser aspects, resembled changes shown by radiosonde data. Th fluctuation intensity changed erratically with time and place, but was usually greatest where th vertical gradient was changing. A rough analysis of the data showed that the larger fluctuation occurred over distances of several hundred m, whereas over distances less than 5 m the fluctuation were negligible (the response of the instrument would have allowed the detection of fluctuation occurring within 0.5 m). Large increases in index were observed on entering cumulus clouds an intense fluctuations were noted within the clouds. *Subject Headings:* **1. Air-borne refractometers 2. Radio refractive index fluctuations.**—*Authors' abstract.*

10L–612 551.508.99:621.396.8

Crichlow, W. Q.; Disney, R. T. and Fulton, F. F., Jr., **Study of radio noise on a geographic basis (Progress report, No. 9, period beginning April 1, 1954).** *U. S. National Bureau of Standards, NBS Report,* No. 5012, Sept. 14, **1956.** 15 p. photos, forms. **DWB**—This report comprises the ninth and final quarterly report on work accomplished on the Radio Noise Studies Program of the Nationa Bureau of Standards and covers the period beginning April 1, 1954. Development work on the ARN-2 Radio Noise Recorder continued. Continuous recordings of radio noise were made at two stations: Front Royal, Va. and Boulder, Colo., using six-frequency modified commercial equipment. A permanent installation for the Boulder Radio Noise Recording Station was completed at Gun barrel Hill, approximately 12 mi northeast of the Boulder Laboratories. A radio noise recording station was completed at an isolated location about 5 mi northwest of Bill, Wyo. Delivery of the ARN-2 Radio Noise Recorders, manufactured by Crown Engineering, Albuquerque, N. M., was completed. *Subject Headings:* **1. Radio Noise Studies Program 2. Radio noise recording stations I. U. S. National Bureau of Standards.**—*Authors' abstract.*

10L–613 551.508.99:551.510.62

Crozier, Albert L. (*Radio Met., U. S. Navy Electronics Lab., Calif.*), **Captive balloon refracto variometer.** *Review of Scientific Instruments,* N. Y., 29(4):276–279, April **1958.** 5 figs., 3 eqs. **DLC**—A system is described for measuring and recording rapid (3 cps) fluctuations of refractive index, humidity (vapor pressure), and temperature using fast response thermistor beads. The system utilizes wet and dry thermistors whose changes are fed into a simple analog computer. The accuracy of the system is 1 part in 10^7 for refractive index, about 0.1 mbar for humidity and 0.1°C for temperature. Measurements can be obtained to an altitude of 5000 ft above the measuring site, with an altitude accuracy of ±50 ft under optimum weather conditions. *Subject Headings:* **1. Air-**

borne refractometers 2. Captive balloon instruments 3. Refractive index fluctuations.—*Author's abstract.*

10L–614 551.508.99:621.396.8:551.521.9

Eriksen, Gunnar (*Civil Engineer*), **Solar radio noise recording equipment built for the solar observatory at Harestua.** *Oslo, Norway. Universitat. Institutt for Teoretisk Astrofysikk, Report* No. 3, May **1953.** 17 p. 15 figs., 4 refs. **DWB**—The present paper deals with the construction of antennas and receivers for the measurement of solar radio noise in the meter-wave length region. An equatorial mount for a giant Würzburg antenna for 1,5 m is described. Some details of a mattress antenna for 5 m are given. A solar noise recording equipment for 1.5 m composed of a low noise receiver and dc amplifier is described in detail. Different methods of measuring receiver noise factor are compared. A device for switching the receiver input periodically to a dummy load has been constructed. *Subject Heading:* **1. Radio noise measurement techniques.**—*Author's abstract.*

10L–615 551.508.99:551.524.7:551.510.3

Leĭkin, G. A., **Zond dlia izmereniia plotnosti i temperatury pri dvizhenii so sverkhzvukovoĭ korost'iu v sil'no razrezhennoĭ srede.** [Sonde for measuring density and temperature during motion at supersonic speed in a highly rarefied medium.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofizich,* No. 4:558–559, April **1958.** 5 eqs. **DLC.** Transl. into English by Nohoum Kadinsky in *Akademiia Nauk SSSR. Bulletin of the Academy of Sciences of the U.S.S.R. Geophysics Ser.,* No. 4:314, April 1958, pub. **1959. DWB, DLC**—A sonde for measuring density and temperature of a medium during supersonic velocity consists of a tube parallel to the velocity of the moving body, covered at the anterior end by a diaphragm, the aperture of which is small relative to the length of the free run in the medium. The distribution, along the cross section of the tube, of molecules entering the tube is determined by the thermal velocity of the molecules as long as their path does not exceed the length of the free run. At that time the stream of molecules entering the tube is determined by the density of the medium and velocity of the body. The medium should be so rarefied that no shock wave can arise in front of the body. An equation is derived for computing the temperature, namely

$$T = \frac{m}{2k}\left(\frac{V_0}{l}\right)^2 \frac{r_2^2 - r_1^2}{\ln \epsilon(r_1) - \ln \epsilon(r_2)}.$$

From the known temperature, velocity of the body and mass of the molecules the density can be determined. *Subject Headings:* **1. Supersonic velocity sondes 2. Upper air temperature measurement techniques.**—*I.L.D.*

10L–616 551.508.99:523.74

Lequeux, J., **Observations photographiques à très haute altitude de la surface du soleil.** [Photographic observations, at very high altitude, of the sun's surface.] *La Nature,* Paris, No. 3281:354–355, Sept. **1958.** 2 figs. **DLC**—Description of the camera telescope drawn up by SCHWARZSCHILD, intended to be carried at very high altitudes where it is completely withdrawn from the atmospheric turbulence. Report of three ascents made by means of a balloon, up to 27.000 m and an account of the results which confirm the convective origin of the solar granulation are given. *Subject Headings:* **1. Air-borne instruments 2. Solar photography 3. Photosphere.**—*A.V.*

10L–617 551.508.99:551.579.5:633.2

Makkink, G. F., **Graslengte en droge-stofopbrengst.** [Grass length and yield of dry matter.] *Wageningen. Instituut voor Biologisch en Scheikundig Onderzoek van Landbouwgewassen, Jaarboek* 1957, pub. **1958.** p. 73–77. 4 figs. English summary p. 77. **DLC**—The length of the grass on the 32 lysimeters was measured in 1954, 1955 and 1956. The yield of dry matter per 10 cm grass length proved to vary between 10.4 kg/a and 19.2 kg/a according to the kind of soil and the time of the season. Perhaps the length of the growing period (cutting regime) had an influence. Grass in the first yr had a very low yield per 10 cm. Also in 1949 the yield per 10 cm varied, namely between 16.5 kg/a and 11.5 kg/a. Study of grass growth therefore cannot be based on measurements of length alone. *Subject Headings:* **1. Grass growth 2. Lysimeter observations 3. Yield of dry matter.**—*Author's abstract.*

10L–618 551.508.99:551.510.62

Moyer, Vance E., **An upper air trajectory technique for the climatological analysis of refractometer soundings.** Texas. Univ. Electrical Engineering Research Lab., Contract AF 19(604)-2249, Report 6-23, Feb. 15, **1958.** 20 p. 8 figs., 5 refs. **DWB** (94.7 T355r)—This research has been undertaken for the purpose of examining a technique that permits the use of the "relative" data obtained by means of air-borne refractometer soundings as a source of "absolute" data that are amenable to unrestricted statistical treatment. The temperature and moisture fields of the 700 mb

surface are advected along streamline trajectories obtained through the isogon-isotach technique in lieu of direct radiosonde measurements, wherever the latter are not available. These data are used to determine the absolute value of the refractive modulus, N, which is then assigned to the 10,000 f point of the refractometer profile, thereby fixing the value of every point on the profile. It is concluded that the quasi-absolute refractive index data thus obtained will provide reasonably accurate statistics which can be used in a synoptic climatological analysis of refractometer measured layer characteristics. *Subject Headings:* **1. Refractive index profiles 2. Air-borne refractometer data.**—*Author's abstract.*

10L–619 551.508.99:551.321.6:551.326.85

Piotrovich, V. V. and Bulatov, S. N., **Pribor dlia tochnogo izmereniia narastaniia l'da na vodoemakh.** [Instrument for correctly measuring the growth of ice on reservoirs.] *Meteorologiia i Gidrologiia*, Leningrad, No. 10:39–41, Oct. **1957.** fig., ref. **DWB, DLC**—A description of a device (illustrated with a diagram) for measuring the growth of ice in reservoirs based upon the method of measuring ice thickness with a tube filled with a nonfreezing fluid, frozen in the ice. The tube is 1.8 m long with an internal diameter of 9 mm; through it a measuring tape, 95 cm long is inserted. The upper end of the tape is fastened to a cap which closes the tube; at its lower end a spherical ball is fastened by means of a metal wire (179.5 cm long). The device is attached to the ice by means of a washer. The growth of ice upward is measured by a probe. The installation of the device, the various dimensions involved, and its operation are described in detail. *Subject Headings:* **1. Ice thickness meters.**—*I.L.D.*

10L–620 551.508.99:681.2.087

Stadnikov, L. K., **Opyt peredelki nedel'nykh chasovykh mekhanizmov samopistsev na sutochnye.** [Converting autographic weekly-hourly recorders into 24-hr recorders.] *Meteorologiia i Gidrologiia*, Leningrad, No. 3:45, March **1956.** 3 figs. **DWB, DLC**—The conversion of the weekly to daily autographic recorder is described with the aid of a diagram. It involves merely the addition of driving gears. *Subject Heading:* **1. Automatic recorders.**—*I.L.D.*

PART B. METHODS OF OBSERVATION AND COMPUTATION, OBSERVATORIES (551.501)

METHODS OF OBSERVATION AND COMPUTATION (551.501)

10L–621 551.501.721:551.521.15

*Beardsley, Niel F. (*Aerial Reconnaissance Lab., Wright Air Dev. Center, Ohio*), **Infrared transmitting windows.** Photostat of separated sheets from *Iris* (Naval Ordnance Lab., Corona, Calif.), 1(2):47–53, Dec. **1956.** 29 figs., 4 eqs. **DWB** (M21.61 B368in)—Data are presented in graphic form on the transmission of various infrared materials as a function of temperature. A brief description of the experimental equipment used to make these measurements is included. *Subject Heading:* **1. Infrared transmission measurements.**—*M.R.*

10L–622 551.501.721:551.521.617:535.245

Benef, P., **Measurement of natural ultraviolet radiation by means of methods with spectral integration.** *International Union of Geodesy and Geophysics. Association of Meteorology, Rome, Sept. 1954, Scientific Proceedings.* London, Butterworth, **1956.** p. 543–548. 2 figs., 4 refs., 3 eqs. **DWB**—The author discusses the extent to which it is possible to measure the spectral intensity of ultraviolet radiation by means of instruments with spectral integration. The principles of the application of the filter-ratio method for the calibration of cadmium cells in energy units and the application of the filter-ratio method to instruments with a cadmium sensitive distribution are discussed and theoretical results are presented. *Subject Headings:* **1. Ultraviolet radiation measurement techniques 2. Spectral intensity.**—*I.L.D.*

10L–623 551.501.71:551.551

Bourot, J.-M., **Comment appliquer les méthodes de visualisation à l'étude des actions du vent sur les constructions.** [How to apply the methods of visualization in the study of wind effects on construction.] *France. Ministère de l'Air, Publications Scientifiques et Techniques*, No. 241:107–111, 1951. 5 figs. **DWB**—Use of powders such as tiny aluminum discs for visual or photographic study of air currents in the laboratory (wind tunnel) is described and illustrated. *Subject Headings:* **1. Atmospheric turbulence 2. Visual observation 3. Wind tunnels.**—*M.R.*

10L–624 551.501:551.525.2:551.524

Budyko, M. I. (*Leningrad*), **Untersuchungen über die Temperatur der Erdoberfläche.** [Investigations of the temperature of the earth's surface.] *Angewandte Meteorologie*, Berlin, 3(4):119–24, June **1958.** 4 figs., 2 tables. **DLC**—After a discussion of the distinction between air temperature and surface temperature and the various methods used to measure the temperature of the earth's surface, the author presents a formula for measuring indirectly the earth's surface temperature on the basis of the method of heat balance. This formula is:

$$\theta_w - \theta = \frac{R_0 - LE - B}{gC_q D + 4_s \sigma \theta^3}$$

where θ_w =the earth's surface temperature; θ =air temperature; R_0 =radiation balance of the earth's surface, calculated by determining effective radiation according to air temperature; L =latent heat of evaporation; E =evaporation; B =heat transformation in the ground; g =air density; C_q =heat capacity; D =coefficient of turbulent diffusion; s =coefficient characterizing the difference between the properties of outward radiating earth's surface and those of a black body; and σ =Stefan-Boltzman radiation constant. By means of several examples it is shown that by means of the heat balance method it is possible to calculate the temperature of the effective surface. And a map showing the mean monthly temperature difference between the active surface and the air for July for the U.S.S.R. is presented and the geographical distribution of this temperature difference is analyzed. The application of the heat balance method to a study of the heat balance of slopes of different orientation is considered and the temperature differences between the active surfaces of northerly and southerly oriented slopes of different inclinations are presented in a table. The increase in temperature differences with the decline in mean altitude of the sun is indicated. The application of the active surface temperature to plant development and the use of the sum of the active surface temperatures rather than of air temperatures (the former being greater) is proposed. *Subject Headings:* **1. Surface temperature measurement techniques 2. Heat balance measurement techniques.**—*I.L.D.*

10L–625 551.501:77.9

Bulavko, A. G., **Kinofil'm "Razvedchiki pogody."** [Movie "Weather Scouts."] *Meteorologiia i Gidrologiia*, Leningrad, No. 4:63, July/Aug. **1955. DWB**—The film illustrates various meteorological episodes, such as taking of weather and aerological observations, collation of information by notes and telegraph. *Subject Headings:* **1. Meteorological films 2. Observation techniques 3. U.S.S.R.**—*I.L.D.*

10L–626 551.501:551.513.1:53.08

Chicago. Univ. Dept. of Meteorology, **Research on hydrodynamic analogues of large-scale meteorological phenomena.** Contract AF 19(604)-1292, Quarterly Status Report, No. 10 covering Oct. 1–Dec. 31, 1957. March **1958.** (6 p.) **DWB** (M13.1 C532g)—The main body of this contract report includes investigations that were undertaken by the University of Chicago on the five wave oscillation case selected for extensive analysis, the new rack and pinions now used for obtaining temperature observations at a large number of points, the use of a new thermistor bridge with the maximum precision of 0.01° to measure a temperature difference. It also includes facts on the recent production by the Vanguard Instrument Corporation of a new analyzer to be used in a polar coordinate system. *Subject Headings:* **1. Laboratory techniques 2. Atmospheric model experiments 3. Hydrodynamic experiments 4. Large scale weather processes.**—*N.N.*

10L–627 551.501.71:551.510.42(62)

El-Fandy, M. G. (*Faculty of Science, Cairo*) and El-Kholy, S. B. (*Faculty of Science, Alexandria*), **On dusty atmospheres in Egypt.** *Mathematical and Physical Society of Egypt, Proceedings*, No. 11:63–75, May 1957, pub. **1958.** 6 figs., 9 tables, 11 refs., 4 eqs. **DWB**—Direct measurements of concentration and size of particles of dust suspended in the atmosphere under various degrees of turbidity have been made, using two different instruments, namely the thermal precipitator (for the first time in Egypt) and an Owens dust counter, together with an oil immersion microscope of a magnification of 1600. The results of measurements of particle size have been represented in various forms such as arithmetic mean, geometric mean, and have been made use of in several aspects of applied meteorology. A comparison between the results obtained using the two methods of sampling dust is also given. On Feb. 5, 1955, a severe dust storm occurred and enabled the collection of a few grams of atmospheric dust. Microscopical analysis was hence accompanied by both chemical and physical analysis and showed that the specimen of atmospheric dust contained traces of radioactive substances. *Subject Headings:* **1. Dust collecting instruments 2. Atmospheric pollution measurement techniques 3. Egypt.**—*Authors' abstract.*

10L–628 551.501:551.578.4 551.501:551.322 551.501:551.525

Flint, Richard F., **Snow, ice and permafrost in military operations.** *U. S. Snow, Ice and Permafrost Research Establishment, SIPRE Report* No. 15, Sept. **1953.** 6 p. table (fold.). **DWB**—Explains the background, history and research program of SIPRE. The major efforts are directed now toward establishing basic properties and relationships for the behavior of water substance in the solid state. The future program will emphasize applied research and operational needs. *Subject Headings:* **1. Snow research 2. Ice research 3. Permafrost research 4. Snow, Ice and Permafrost Research Establishment (SIPRE).**—*A.A.*

10L–629 551.501.75:551.5

Frith, R., **The measurement of surface wind.** *Great Britain. Meteorological Research Committee, M.R.P.*, 989, 1st June **1956.** 3 p. 2 refs. Mimeo. **DWB**—Problems discussed are assessment of wind at 10 m in an open situation, and assessment of actual wind at any place or height taking account of terrain and obstacles. Accuracy of 5% in speed and 5° in direction cannot be achieved until more is known about effect of local obstacles. An investigation is proposed. *Subject Heading:* **1. Wind measurement.**—*C.E.P.B.*

10L–630 551.50

Ingalls, Albert G., **The amateur scientist.** *Scientific American*, 189(4):114–117, Oct. **1953.** 2 figs. **DWB**—Most of this article is concerned with a description of the U. S. Weather Bureau network of amateur weather observers (cooperative observers) and what they contribute to society. The activities of 3 or 4 individual observers in local service, microclimatological or paleoclimatological studies are recounted. A chart shows the location of the thousands of stations in the U. S. Extremes of rainfall, snowfall and temperature in the U. S. are derived from cooperative records. *Subject Headings:* **1. Cooperative observers 2. Cooperative observer network 3. U. S. Weather Bureau 4. Weather extremes.**—*M.R.*

10L–631 551.501:551.594.12:551.588.

Ishikawa, G.; Kadena, M. and Kitamura, M. (*all, Met. Res. Inst., Tokyo*), **Effect of the atmospheric electric field upon the observations of ions in the atmosphere.** *Journal of Geomagnetism and Geoelectricity*, Kyoto, 4(1):1–6, April **1952.** 3 figs., eqs. **DLC**—In the observation of ions in the atmosphere, we must consider that the observed values should differ from those in the free atmosphere due to the deformation of the atmospheric electric field caused by the existence of the building within which the observing instruments are located. Therefore, comparison among the observed values at various positions would be meaningless, without taking into account such an effect of the electric field. In this paper, we tried to find the suitable position of the aperture for drawing the air into the building in a few simple cases, so that such an effect need not be considered. *Subject Headings:* **1. Ionization measurement techniques 2. Building influences.**—*Authors' abstract.*

10L–632 551.501:551.578.46

Ishiwara, Konji (*Central Forecast Sect. of Met. Obs., Tokyo*), **Design for snow survey and its arrangement.** *Researches on Snow and Ice*, Tokyo, No. 2:165–179, Jan. **1955.** 13 figs., 7 eqs. In Japanese. **DWB**—Discussions are given of observations along the snow courses, observations at the main observatory, water equivalent data arrangement at the main observatory, determination of calculated data for the total area water equivalent of snow, study of observed data of water equivalent of snow, precipitation and snow melt corrections for the calculated data with respect to the observed data, and the calculation of area water equivalent of snow. Sample cases are graphically presented. *Subject Headings:* **1. Snow surveys 2. Water content of snow.**—*J. H. Woo.*

10L–633 551.501.75:551.553.22

Kobayashi, Shigeki, **On the seasonal winds in autumn over Kawagishi Village, the Valley of Tenryu.** *Journal of Agricultural Meteorology*, Tokyo, 9(1):17–19, Dec. **1953.** 2 figs., 8 refs. In Japanese; English summary p. 19.—Prevailing wind directions determined from the way rice plants are bent are indicated in a general and a detailed chart for a region near the city of Okaya. The directions indicated appear to be in agreement with the region's topography. *Subject Headings:* **1. Plants as wind indicators 2. Seasonal winds 3. Wind observation 4. Kawagishi, Japan.**—*G.T.*

10L–634 551.501:681.177

Makjanić, B., **Upotreba statističkih mašina u meteorologiji.** [Use of statistical machines in meteorology.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 1(3/4):54–56, July/Oct. **1952.** 3 ref. **DWB**—After a brief historical survey of the use of index cards for statistical purposes the author describes the punched card system of the U. S. Weather Bureau and explains some of the meteorological and climatological tasks which can be accomplished by means of punched cards. *Subject Heading:* **1. Punched card applications.**—*G.T.*

10L–635 551.501.75:551.510.42

Morozov, V. A., **Opredelenie soderzhaniia nekotorykh nepredel'nykh uglevodorodov v vozdukhe.** [Determination of content of some unsaturated hydrocarbons in the air.] *Gigiena i Sanitariia*, Moscow, No. 7:47–48, July **1955.** table. **DWB**—The author describes a method for brominating unsaturated hydrocarbons and increasing the sensitivity of the recommended titrimetric method based upon the use of pyridin-bromosulfate arsenious acid and that of bromination with bromine water. The application of this method to air samples calculated in the vicinity of a factory is illustrated. *Subject Headings:* **1. Air sampling and analysis 2. Atmospheric pollution.**—*I.L.D.*

10L–636 551.501:551.578.46

Ônuma, Masayuki and Kojima, Chuzaburo, **Trial production of snow depth recorder.** *Seppyo*, Tokyo, 12(2):21–23, **1950.** figs. In Japanese. **DWB**—Authors constructed a recorder for measuring the depth of snow cover, based on a principle quite similar to the Jordan type of sunshine recorder, consisting of a long light-tight box with a series of pinholes through which the sun may shine, leaving a track for the heights free from snow cover upon the sensitized paper within. A record of a whole season may be made without changing the paper, for the altitude of the sun changes regularly. A weak point of this recorder is that it does not record days without sunshine. *Subject Headings:* **1. Snow depth measurement techniques 2. Snow depth recorders.**—*H.A.*

10L–637 551.501.71:546.212

Pícha, Jaroslav, **Přízemní ozón a jeho měření.** [Ozone near the ground and its measurement.] *Meteorologické Zprávy*, Prague, 11(4/5):92–97, **1958.** 10 figs., 18 refs. Russian and German summaries p. 92. **DWB, DLC**—Most of the current methods of chemical ozone measurement are based on the following reaction of O_3 with aqueous solution of KI: $O_3+2KI+H_2O \rightarrow I_2+2KOH+O_2$. By measuring the amount of iodine, the original amount of ozone can be determined. The different techniques discussed (with diagrams of apparatus) include those of REGENER, CAUER, TEICHERT and IHMERT. *Subject Headings:* **1. Ozone measurement techniques 2. Ozone near the ground.** *G.T.*

10L–638 551.501.71:551.510,42:546.13

Polezhaev, N. G., **K metodike opredeleniia aktivnogo khlora v vozdukhe.** [Methods of determining active chlorine in the air.] *Gigienia i Sanitariia*, No. 11:46–47, **1955. DLC**—Some changes in the usual method of calorimetric determination of small quantities of active chlorine in the air are introduced. The solution of hydrochloride dymethyl paraphenyl endyamin diluted with acidified hydrochloric acid, used usually as absorbent, is substituted by a 1% solution of potassium iodide on a 1% solution of sodium acetate, which has a stabilizing effect on the reaction of the solution. The method is convenient because of the use of easily prepared and accurately titrated iodine solution, and the fact that during the absorption of chlorine there proceeds a separating of an equivalent quantity of iodine which is sufficiently stable in this solution and enables one not to hurry the analysis of the sample. *Subject Headings:* **1. Chlorine content of air 2. Chlorine content air measurement.**—*A.M.P.*

10L–639 551.501:551.721.521:551.508.822

Reshetov, V. D., **Methoden zur Berechnung der Strahlungsfehler von Radiosonden.** [Methods of calculation of the radiation errors of radiosondes.] *Zeitschrift fur Meteorologie*, Berlin, 12(1/2):46–50, Jan./Feb. **1958.** 4 tables, 7 refs., 8 eqs. **DWB, DLC**—Radiation errors of radiosondes, which may attain 6–8°C at the 50 mb level, are discussed with the aid of data giving mean temperature differences of the U.S.S.R. radiosonde (RS-049) and radiosondes of other countries (France, England, Japan and Finland) during daylight hours. The correction for radiation error is based upon the assumption that in equilibrium during a balloon ascent the heat impinging upon the thermal sensor from direct, diffuse and reflected solar radiation, (q) warms the sensor by an amount Δt, equal to the amount of heat removed by an impinging air current. This physical assumption is written $q=\alpha\cdot\Delta t$, where α=coefficient of heat loss through convection and from it the equation for the radiation error of the radiosonde as a function of solar altitude and height of ascent is derived, namely:

$$\Delta t = D_0(w_0/w)^{0.8}e^{0.8}(gz/RT_m)\sin(h+\beta).$$

The application of this correction to radiosonde balloons of various countries is illustrated and the procedure for making the correction is outlined in detail. *Subject Headings:* **1. Radiation error of radiosondes 2. Radiosonde corrections.**—*I.L.D.*

10L–640 551.501.1:551.576.1 551.576:001.4

Shinners, Willard (*Marine Obs., U. S. W. B.*), **Hints to the observer on cloud names and characteristics.** *Mariners Weather Log*, Wash., D. C., 2(6):183–184, Nov. **1958.** 3 photos. **DWB**—

Interpretation of the state of the atmosphere as based upon characteristic cloud formations s discussed briefly. The meaning of the latin cloud name "cumulus" and the affixes, "humilis "congestus," "nimbus" and "fractus" are given. *Subject Heading:* **1. Cloud terminology.**—*W.N.*

10L–641 551.501:551.5:061.1(788

Stegall, Gilbert E., **Some facts about cooperative weather observers (1958).** 6 p. 8 fig Carbon of typescript. **DWB** (M06 U587so)—Of the 3700 volunteer observer weather stations in th Kansas City Region, 30% are nonindividual and 70% individual observers. A punch card recor is kept for each observer or substation. 17% are salaried employees and 16% farmers. Some ha had over 60 yrs of service. 63% are over 50 yrs of age, the youngest being 17 and the oldest 9 29 were appointed before 1900. Details of the statistics of age, length of service, year of appointmen sex, occupation, turnover, reasons for quitting, etc. are shown graphically and discussed. A samp of the punch card is shown. *Subject Headings:* **1. Cooperative observers 2. U. S. Weather Bureau 3. Kansas City Region.**—*M.R.*

10L–642 551.501:551.584:35

Texas. Agricultural and Mechanical College. Dept. of Oceanography, **The design of micro meteorological experiments.** Contract SC-70138, Contract DA-36-039, First Quarterly Progres Report, Oct. 4, 1955–Jan. 3, **1956.** 26 p. **DWB**—This report contains a brief survey of the preser capabilities and limitations of the field of micrometeorology, with special emphasis upon militar application. From this survey an attempt is made to list those areas in which further experimenta tion is needed. Such experimental work is classified according to whether the data are needed t implement, to confirm, or to inspire theoretical developments. *Subject Headings:* **1. Micrometeorc logical research 2. Military meteorology. I. DA-36-039-SC-70138.**—*Author's abstract.*

10L–643 551.501:551.57:551.57

†United Nations. Economic Commission for Asia and the Far East, **Standards for methods an records of hydrologic measurements.** Its *Flood Control Series*, No. 6, **1954.** 82 p. 13 figs., 28 refs **DWB**—In Pt. 1 "Methods of Hydrology measurement" Ch. 1 (p. 11–18) gives recommended stanc ards and specifications for instruments and observations of precipitation (rain, snow and dew), an evaporation. Ch. 7 (p. 49–68) gives standard forms for recording hydrological elements (precipita tion and evaporation, water level, discharge, yields of wells, sediment, etc.). Pt. 2 (p. 69–80 describes and gives standard forms for various sections of hydrologic yearbooks (precipitation evaporation, water level, etc.). In the appendix (p. 81–2) there is a selected bibliography on hydrc logic measurements. The work was compiled by and for Southeast Asian Countries but wit collaboration of the WMO. *Subject Headings:* **1. Hydrometeorological observations 2. Hydrologi measurement 3. Yearbook forms.**—*M.R.*

10L–644 551.501:551.58

Wagner, Richard, **A különböző ökológiai viszonyú területek mikroklímamérési módszerei** [Methods of microclimatological observation for different ecological regions.] *Időjárás*, Budapest 59(3):165–169, May/June **1955.** Russian and French summaries p. 165. **DWB, DLC**—Genera problems of microclimatological measurement are discussed, such as purposes of such measurement choice of place and site, instruments, exposure, number of measurements, effect of various meteoro logical factors (dew, fog, cloudiness), etc. *Subject Headings:* **1. Observation techniques 2. Micro climatological observation.**—*G.T.*

10L–645 551.501:551.57

Waldron, T., **We often say, 'It isn't heat, it's humidity.'** *Power*, New York, 98(5):128–129 May **1954.** figs. **DLC**—By means of graphs and schematic diagrams the author shows how t calculate the various humidity parameters such as vapor pressure, relative humidity etc., and the meaning in physical terms of dry bulb, wet bulb, cooling by evaporation and vapor pressure, etc *Subject Headings:* **1. Humidity calculations 2. Definitions.**—*M.R.*

INSTRUCTIONS FOR OBSERVERS (551.501.1)

10L–646 551.501.1:551.507.362.2

Brouet, J. and Lemmens, J., **Observation des satellites artificiels.** [Observation of artificia satellites.] *Ciel et Terre*, Brussels, 74(1/2):145, Jan./Feb. **1958. DLC, DWB**—Suggestions an instructions to voluntary (amateur) observers participating in satellite observation. *Subject Head ing:* **1. Satellite observation techniques.**—*A.V.*

10L–647 551.501.1:551.509.1(52)

Dominican Republic. Servicio Meteorológico (*de la Marina de Guerra*), **Curso de observadores, Manual A, Partes meteorológicas (descifrado, interpretación y representación de los informes internacionales).** [Observers' course, Manual A, Meteorological parts: coding, interpretation and representation of international reports.] Ciudad Trujillo, March **1955.** 31 p. figs. **DWB.** Also: **Pt. B, Manual B, Observaciones meteorológicas (realización y cifrado).** [Observers course, Manual B, Meteorological observations, Computing and coding.] Ciudad Trujillo, Aug. **1954.** 44 p. figs., tables, 27 refs. (p. iii). Mimeog. **DWB**—A voluminous mimeographed course and manual of instructions for observers, especially those in the tropics, with general principles of meteorology, (clouds, visibility, wind, pressure, etc.) and observational instructions, codes, and tables for all types of surface and upper air wind observations. Pt. A gives the complete international codes (in Spanish). *Subject Headings:* **1. Observers manuals 2. International meteorological codes 3. Spanish instructions. I. Huerta, Fernando** (*ed.*).—*M.R.*

10L–648 551.501.1:551.508.23(410)(7)

Gorozyński, Władysław (*Copernicus U. Toruń*), **Comparison and interconversion of visible and bright sunshine hours in the United States and Europe.** *Československá Fysiatrická Společnost, Prague, Věstník,* No. 1–6, **1948.** p. 11–12. tables, 10 refs. In English; summaries in Czech and Russian p. 21–22. Abstracted from reprint. **DWB**—The investigation carried out by the author concerning sunshine duration prompted the special analysis of the differences between sunshine duration data obtained by the British and the U. S. registration systems. The electrical recorder used in the U. S. is based on the differential air thermometer and registers the direct plus diffuse radiation falling on a horizontal surface. The Campbell-Stokes recorder used in Britain gives only the duration of bright sunshine hours but does not represent all visible sunshine hours. Special observations by both systems were made at Blue Hill Observatory, Mass., during Feb.–May 1932, at San Diego, Calif., during Dec. 1939–1941, and at the same time at the observatory in Tacubaya, Mexico. These investigations, as well as a comparison of the records of the stations located along the border of the U. S. and Canada show that all Campbell-Stokes data must be corrected by subtracting for winter 0.5, spring 1.3, summer 1.5, autumn 0.7, and year 1.0 sunshine hrs per day. *Subject Headings:* **1. Instrument comparisons 2. Sunshine recorders 3. Sunshine duration 4. Instrument errors 5. Campbell-Stokes sunshine recorder 6. Great Britain 7. United States 8. Tacubaya, Mexico.**—*N.T.S.*

10L–649 551.501.1

Maftynov, S. I. and Popov, O. S., **Ne otryvaiutsia li ot praktiki nashi teoretiki.** [Aren't our theorists getting away from the practical?] *Meteorologiia i Gidrologiia,* No. 2:59–60, March/April **1955. DLC**—The authors criticize the new edition of **Instructions** for hydrometeorological observers. Particular criticism is leveled at textual errors, inadequacy of directions for cloud and fog observations, lack of illustrations, etc. *Subject Headings:* **1. Instructions for observers 2. Soviet instructions.**—*I.L.D.*

10L–650 551.501.1:551.577

Roller, Maria (*Vienna*), **Ein Beitrag zur Kritik der Niederschlagsmessung.** [A contribution to the critique of precipitation measurement.] *Wetter und Leben,* 5(11/12):223–225, Dec. **1953.** 2 tables. **DLC**—A report of a study to determine the extent to which the precipitation measured by a single rain gage is representative of a surrounding area of several square km. The method of investigation involved the analysis of precipitation data obtained from double stations originally set up in order to combine older with more recent observation series. An analysis of the data from two neighboring precipitation stations show that not only the degree of shielding of the measuring station but also the orographic position of the area is important. *Subject Headings:* **1. Precipitation measurement 2. Precipitation analysis.**—*I.L.D.*

10L–651 551.501.1

Seliverstov, A. M., **Zamechaniia po povodu nastavlenii i rukovodstv.** [Remarks on instructions and regulations.] *Meteorologiia i Gidrologiia,* No. 4:66–67, April **1956. DWB, DLC**—A number of errors found in the instructions and regulations issued to hydrometeorological stations are corrected. *Subject Headings:* **1. Instructions for observers 2. Soviet instructions.**—*I.L.D.*

10L–652 551.501.1:551.524:551.571

Shinners, Willard (*Marine Observations, U. S. W. B.*), **Hints to the observer [on] temperature and dew point.** *Mariners Weather Log,* Wash., D. C., 2(3):68–69, May **1958. DWB, DLC**—In order to forecast properly, a thorough knowledge of temperatures and dew points, convective cloud heights, and precipitation is indispensable. Psychrometric readings should be taken on the windward side

of the bridge in a shaded location and a moistened wick should be used to guard against any errors in reading. Other important hints for accurate temperature include the changing of the wick whenever it is soiled or has an accumulation of scale. When the markings on the thermometer become hard to distinguish the port meteorological officer should be invited to fill in the markings with lamp black. *Subject Headings:* **1. Temperature observation techniques 2. Dew point calculation.**—*N.N.*

10L–653 551.501.1:551.515.2

Shinners, Willard (*Marine Observations, U. S. W. B.*), **Tropical storm weather.** *Mariners Weather Log*, Wash., D. C., 2(4):110, July **1958. DWB, DLC**—The hints to the observer given here are actually clues to be on the alert in case the disturbance should develop into a full fledged storm. The situation similar to a potential tropical storm build up is shown on the cover of this magazine. If at sea in tropical waters during storm seasons, the indicators of storm development are listed here for reference. *Subject Headings:* **1. Instructions for observers 2. Tropical storm movement.**—*W.N.*

10L–654 551.501.1:551.59

Shirley, J. A., (*U. S. W. B. Marine Observations*), **Hints to the observer on visibility.** *Mariners Weather Log*, Wash., D. C., 2(5):149–152, Sept. **1958.** 2 figs., 2 tables. **DWB**—The visibility scale as modified for marine use is illustrated and discussed. Only the code figures from 90–99 of the synoptic visibility code as presented unabridged from 00–99 are used here. *Subject Headings:* **1. Instructions for observers 2. Visibility scales.**—*W.N.*

10L–655 551.501.1:551.4:378

Stasevich, A. A., **Ispol'zovanie materialov nabliudeniia pogody na urokakh fizicheskoĭ geografii.** [Use of weather observation data during lessons on physical geography.] Ed. by I. S. Matrusov. Moscow, Akademiia Pedagog. Nauk RSFSR, **1956.** 22 p. forms. (*Akademiia Pedagogicheskikh Nauk RSFSR. Institut Metodov Obucheniia, Pedagogicheskie Chteniia.*) **DLC** (QC871.S8)—In this report the author discusses briefly the importance of training 5th–7th grade elementary school pupils in weather observation, with some remarks concerning the program of studies, an account of his method of organizing the simplest weather observations for this group with the simplest instruments: a thermometer, a barometer, a wind vane and a rain or snow gage. Models of diagrams and graphs used by pupils are appended. *Subject Heading:* **1. Teaching of meteorology in elementary schools.**—*A.M.P.*

10L–656 551.501.1(438)

Trybowski, Czesław, **Do kolegów obserwatorów.** [To fellow observers.] *Gazeta Obserwatora PIHM*, Warsaw, 4(11):1–2, Nov. **1951. DLC**—While traveling during his summer vacation in the region of Kłodzk, Wałbrzusk and Beskid Mountains the author had the opportunity of visiting a series of 3rd and 4th order meteorological stations. In this appeal to fellow observers, after having related details about the chaos reigning in the majority of the stations, e.g., inaccuracy of observations, nonobservance of prescribed terms of observation, disorderly and irresponsible maintenance of equipment and instruments, disrespectful attitude even towards this periodical, the author invites his colleagues to put an end to such a state of affairs and choose the 34th anniversary of the great October revolution as a turning point in their attitude towards the fulfillment of their duties. *Subject Headings:* **1. Observational errors 2. Forecast improvement 3. Poland.**—*A.M.P.*

10L–657 551.501.1(777) 551.582.2(777)

*U. S. Weather Bureau, **Des Moines, Iowa meteorological summary, 1878–1948.** Pub. by the Bureau in cooperation with the Iowa Department of Agriculture, **1949?** 13 p. mostly tables. **DWB**—This attractive little pamphlet contains the usual U. S. W. B. summary table for 1948 and in addition a verbal account of the important features of the climate of Des Moines, and tables giving monthly and annual values for each year of record from 1878–1948, showing mean temperature, degree days (heating), killing frosts, length of growing season, precipitation, snowfall, number of days with snow cover (0.1 in. or more), and daily normal, highest on record and lowest on record temperatures. Temperature range is from −30°F–+10°F. A history of the instrument exposures from 1878–present is included. *Subject Headings:* **1. Annual meteorological data summaries 2. Climatic summaries 3. Climate of Des Moines, Iowa 4. Des Moines, Iowa. I. Lamoureaux, C. E.**—*M.R.*

10L–658 551.501.1:551.524 551.508.26/9

†Vos, A. S. (*Landbouwhogeschool, Wageningen*), **Methodes en instrumenten voor het meten van temperaturen en het gebruik van thermistors (N. T. C. weerstanden) als nieuwe mogelijkheid ervoor.** [Methods and instruments for measuring temperature and the use of thermistors as a new possibility for this purpose.] *Chemisch Weekblad*, Amsterdam, 49(5):68–76, Feb. **1953.** table, bibliog. p. 74–76.

bstracted from reprint. **DLC**—A review of modern temperature measuring elements and methods, iscussing troubles developing with thermocouples and platinum resistance thermometers, which are pecially suited for the measurement of small fast temperature fluctuations. Thermistors are iscussed in more detail adding an exhaustive bibliography. *Subject Headings:* **1. Thermometers . Thermometry 3. Thermocouples 4. Thermistors.**—*A.A.*

10L–659 551.501.1

Zotin, M. I. and Shipilov, F. D., **Ob odnoĭ "neuviazke" v Nastavlenii gidrologicheskim stantsiiam i postam.** [Inconsistency in the Instructions for hydrometeorological stations and posts.] *Meteorologiia i Gidrologiia*, No. 2:47, March/April, **1955. DLC**—It is pointed out that the **Instructions** specify that for rivers the thickness of ice and snow should be measured on the last day f a decade (pentad) and month, while for seas the thickness is to be measured on the first day of a ecade. *Subject Headings:* **1. Instructions for observers 2. Soviet instructions.**—*I.L.D.*

SYSTEMS OF UNITS, WEATHER NOTATIONS, SCALES (551.501.3)

10L–660 551.501.3:551.501.42:001

Battione Chiarino, J. A., **Algunas definiciones, fórmulas constantes y tablas empleadas en meteorología.** [Some definitions, formulas, constants and tables used in meteorology.] *Revista Meteorológica*, Montevideo, 13(49):40–112, Dec. **1955.** 52 tables, 17 refs. **DPU**—Contains a lossary of terms relating to dynamic or physical meteorology; formulas, constants and psychrometric, hypsometric and conversion tables (from metric to English units), with particular emphasis n humidity, dew point, pressure and wind. *Subject Headings:* **1. Constants 2. Spanish glossaries . Psychrometric tables.**—*M.R.*

10L–661 551.501.3

Huxley, L. G. H., **Rapport de la Commission de radioélectricité ionosphérique sur la nomenclature magneto-ionique.** [Report of the Ionospheric-Wireless Commission on the magneto-ionic nomenclature.] *International Scientific Radio Union, Brussels, Bulletin of information*, No. 107:19–2, Jan./Feb. **1958. DLC**—Since the Gauss unit system (u.e.s.), the electromagnetic system (u.e.m.) nd the rationalized m.k.s. system are used by the physicists and the engineers, it is interesting to stablish and to present the formulas of electromagnetism, in a form independent of the system hosen, but from which the scientific formulas in any system of coherent units can be directly obtained. For this purpose, it is necessary to introduce three parameters ϵ_0, μ_0, γ, the accurate values of which will be determined through the unit system finally adopted. The parameters ϵ_0, μ_0, γ are not independent but, in every coherent unit system they must verify the relation: $\gamma^2\epsilon_0\mu_0 = 1/c^2$ where c =the speed of the light in the vacuum, expressed in the corresponding system of length and time units. The author gives several examples of generalized formulas. *Subject Headings:* **1. Unit systems 2. Magneto-ionic nomenclature.**—*A.V.*

10L–662 551.501.3:551.515.1

Kunits, A. V., **O kolichestvennoĭ kharakteristike tsiklonicheskoĭ deiatel'nosti.** [Quantitative characteristics of cyclonic activity.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:29–30, June **1956.** ef., 5 eqs. **DWB, DLC**—Since neither the averaging of the number of closed isobars nor the difference in pressure between periphery and center provides a physical basis for expressing quantitatively he characteristics of large scale cyclonic or anticyclonic processes, the author develops an index of cyclonicity which is the mean of the sum of the square of the number of closed isobars. The index s proportional to the kinetic energy of the waves of air carried in the circulation of a given cyclone. The application of this index is discussed. *Subject Headings:* **1. Index of cyclonicity 2. Cyclonic activity.**—*I.L.D.*

10L–663 551.501.3

Escala de Beaufort para una altura aproximada de 6 metros (20 pies) sobre el suelo sin obstrucciones. [Beaufort scale for a height of approximate 6 m (20 ft) above the ground without obstruction.] *Revista Meteorológica del Peru*, Lima, 1(1):16–17, Dec. **1954. DWB**—Beaufort wind scale (0–12) is presented with corresponding speeds in m/s and mi/hr, and visible effects expressed in Spanish. *Subject Heading:* **1. Beaufort scale.**—*M.R.*

10L–664 551.501.3:551.591

Saito, R., **On the homogeneity of observed values of visibility.** *Journal of Meteorological Research*, Tokyo, 8(5):285–289, June **1956.** 5 tables. In Japanese; English summary p. 285. **DWB, DLC**—Progress in visibility observation in the Japanese meteorological network is reviewed. Visibility observation started in 1932 and observation methods were improved in 1940 and 1950

but need further refinement. *Subject Heading:* **1. Visibility observation techniques.**—*Based o author's abstract.*

10L–665 551.501.3:529.7

Singer, Irving A. and Raynor, Gilbert S. (*both, Brookhaven Nat. Lab.*), **Solar time classificatio for meteorological use.** *American Meteorological Society, Bulletin,* 39(11):569–573, Nov. **1958** 6 figs., table, 3 refs. **DWB, DLC**—In order to effect a more consistent grouping of hourly meteorc logical data influenced by the diurnal cycle, a chronology based on the time of sunrise and sunse was devised. A code classified all hours within each bi-weekly period by this time system. Thi classification was further extended by dividing the year into solar seasons, defined as periods of tim during which the distribution of solar hours is uniform. The use of solar time as a major classificatio in the analysis of two yrs of hourly wind and temperature data obtained from six levels on the 42 ft meteorological tower at Brookhaven National Laboratory resulted in a better understanding of thi relationship between the variables than could have been obtained by the use of standard time Results of several lapse rate and wind profile studies made using both standard and solar tim demonstrated the advantage of the latter system. Application of this method to other problem and regions is discussed. *Subject Headings:* **1. Solar time classification 2. Methods of computation** —*Authors' abstract.*

10L–666 551.501.3:551.510.42:551.510.72

Terraglio, F. P.; Sheehy, J. P. and Manganelli, R. M. (*all, Rutgers Univ., Dept. of Sanitation New Brunswick, N. J.*), **Recommended units of expression for air pollution.** *Air Pollution Contro Association, Journal,* Pittsburgh, Pa., 8(3):220–222, Nov. **1958. DWB, DLC**—There is a wid variation in the terminology used in reporting atmospheric pollution data, with many units of ex pression being carryovers from other fields of study. This paper lists many of the units currentl in use, with alternative recommended units to be used specifically in the field of air pollution. These units were selected according to the following criteria: use of dimensions actually measured; unit that require no extrapolation, and units as nearly uniform as possible; and practical units. *Subjec Heading:* **1. Atmospheric pollution terminology.**—*N.N.*

10L–667 551.501.3:551.55(26

Verploegh, G. (*Koninklijk Nederlands Met. Inst., De Bilt, Netherlands*), [**Discussion of**] **Charles F. Brooks and Eleanor S. Brooks: The accuracy of wind-speed estimation at sea (and reply by E. S Brooks).** *American Geophysical Union, Transactions,* 39(5):968–970, Oct. **1958.** 3 refs., eq **DWB, DLC**—A discussion of the various factors which influence Beaufort estimates of the win force at sea is made on the basis of the data of many vessels. The paper covers also the evaluation based on the original data as obtained from the first routine observations of ocean weather ships *Subject Headings:* **1. Wind speed estimation at sea 2. Beaufort wind equivalent accuracy.**—*N.N.*

METHODS OF AND TABLES FOR REDUCTION (551.501.42)

10L–668 551.501.42:681.14:621.38

Electronic aid to weather research. *American Meteorological Society, Bulletin,* 36(8):420–421 Oct. **1955. DWB**—A description of the operation of the ALWAC III electronic computer purchased by the U. S. Weather Bureau, and used at the National Weather Records Center at Asheville, N. C. *Subject Headings:* **1. Electronic computers 2. Climate data processing 3. ALWAC III.**—*I.L.D.*

10L–669 551.501.42

Burckhardt, Elfriede and Burckhardt, Hans, **Graphisches Rechnen mit Feldern skalarer und vektorieller Grössen in der Meteorologie.** [Graphic calculation of scalar and vector fields in meteorology.] *Germany. Deutscher Wetterdienst, Berichte,* No. 12, **1954.** 38 p. 46 figs., 95 charts (in pocket), 2 tables (fold.), numerous eqs. **DWB, DLC**—A more thorough elaboration of the methods of graphic calculation for scalar and vector fields developed by V. Bjerknes is presented. The contents include: graphic addition of scalar fields, graphic addition of vector fields with and without analysis of the components, graphic subtractions, graphic multiplication and division of scalar fields, graphic multiplication of vector fields, graphic differentiation and graphic calculation with spatial fields. *Subject Headings:* **1. Graphic presentation 2. Graphic scalar fields 3. Graphic vector fields.**—*I.L.D.*

10L–670 551.501.42:551.521.1

D'aichenko, L. N., **Sviaz' mezhdu radiatsionnym balansom i summarnoĭ radiatsieĭ.** [The connection between radiational balance and global radiation.] *Meteorologiia i Gidrologiia,* Lenin-

ad, No. 8:29–33, Aug. **1958.** 3 figs., 2 tables, 3 refs., 3 eqs. **DWB, DLC**—The author attempts to ablish a relationship between the intensity of radiation balance, B, and intensity of total radiation, in order to obtain the radiation balance by computing means of total radiation values. The ultiple value of radiation balance is computed by equation $B''=Q(1-A)-E_\epsilon$, where A =albedo underlying surface, E_ϵ =effective radiation of the underlying surface. The results of calculation E_ϵ, computed from the Kovalev nomogram and of B'', measured values of B and $B-B''$ are pre- nted in a table. A simplified method of extending the series of observations involves the use of the uation $B=kQ+b$ where the angular coefficient k and b were determined by using least squares. raphs showing the relationship between B and Q, the annual variations of k and of b for different ations are presented, and the variation of these coefficients with stable and unstable snow cover d the accuracy of the radiation balance computed with the aid of these coefficients are discussed. *ubject Headings:* **1. Radiation balance calculations 2. Global radiation-radiation balance relation- ips.**—*I.L.D.*

10L–671 551.501.42:536.63

*Dinkelacker, Otto, **Thermische Grössen und ihre funktionelle Abhängigkeit für Eis, Wasser nd Wasserdampf bei den in der freien Atmosphäre vorkommenden Temperaturen.** [Thermal tensity and its functional dependence for ice, water and water vapor in the temperatures which cur in the free atmosphere.] *Germany. Deutscher Meteorologischer Dienst im Französischen esatzungsgebiet, Wissenschaftliche Arbeiten*, 1:24–33, **1947.** 2 figs., 5 tables, 55 eqs. In German; rench and English summaries p. 33. **DLC**—The formulas, curves and tables for calculating pecific heat of gases, liquids and solids are presented and discussed, and the tables for saturation ver water and over ice are also presented. *Subject Headings:* **1. Vapor pressure tables 2. Constants.**—*M.R.*

10L–672 551.501.42:551.55

Diubiuk, A. F., **Opredelenie vetra cherez pole davleniia pri uchete treniia vertikal'nogo i orizontal'nogo peremeshivaniia.** [Wind determination from the pressure field taking into account riction of vertical and horizontal mixing.] *Akademiia Nauk SSSR, Izvestiia, Ser. Geofizicheskaia*, No. 2:274–276, Feb. **1958.** 3 refs., 21 eqs. **DLC.** Transl. into English by John Miller issued by American Meteorological Society under Contract AF 19(604)-1936, June 1958. 7 p. Also: Transl. into English by Irving Emin in *Akademiia Nauk SSSR. Bulletin of the Academy of Sciences of the U.S.S.R. Geophysics Ser.*, No. 2:151–152, 1958, pub. **1959. DWB, DLC**—The author derives equations for determining the wind from the pressure field taking into account both vertical and horizontal friction for a nonstationary situation, for a stationary situation and for the movement of air in a given pressure field in two sided and three sided angles. *Subject Headings:* **1. Wind calcula- ions 2. Pressure fields.**—*I.L.D.*

10L–673 551.501.42:551.579.4(560) 551.501.9:551.577(560)

Gutberlet, Friedrich, **Die Berechnung von Hochwasserabflüssen in der Türkei.** [Calculation of flood discharge in Turkey.] *Deutsche Gewässerkundliche Mitteilungen*, Coblenz, 2(3):49–55, June **1958.** 2 figs., 6 tables, 10 eqs. **DWB** (627.51(56)—There are now 146 regular rainfall stations in Turkey, 54 of which have been in operation 20 yrs or longer. The author discusses the information available from these stations and from runoff observations and proceeds to report and present in tabular form the results of a study in which maximum flood discharges, calculated by methods of different authors, are compared with actual values observed during floods of the periods 1914–1918, 1955 and 1957. *Subject Headings:* **1. Maximum flood discharge calculations 2. Rainfall stations 3. Turkey.**—*G.T.*

10L–674 551.501.42:551.574.41

Harrold, Lloyd L. and Dreibelbis, F. R., **Evaluation of dew amounts.** *International Union of Geodesy and Geophysics. Association of Scientific Hydrology, Toronto, Sept.* **1957**, [*Transactions*], Vol. 2, pub. **1958.** p. 460–465. fig., 4 tables, 3 refs. **DWB** (M(06)1611g)—The automatic print-weigh mechanism on the lysimeters at the U. S. Dept. of Agriculture, Soil and Water Conservation Research Division Station at Coshocton, Ohio provides data from which the daily amounts of dew have been calculated. On the 0.002 acre natural soil where it stands, the largest amount of dew in a single day amounts to 0.08 in. of water in the area with a continuous coverage of legumes and grass. The greatest monthly total in Aug. 1951 was 1.39 in. The total amount of condensation and absorption often exceeds 10 in. of water. Condensation and absorption on the dry area are usually greater than on the moist soil. In 1953 the daily value of the former plot was 0.05 in. and on the moist soil only 0.004 in. during several days in August of that yr. *Subject Headings:* **1. Lysimeter measure- ments 2. Dew calculation.**—*N.N.*

10L–675 550.38:551.501.1

Hernández, Roberto P. J., **Proceso de reducción de observaciones de campañas magnéticas** [Method for reduction of observations of magnetic fields.] *Meteoros*, Buenos Aires, 1(2–3):198–20 June 1951. 2 figs. Spanish and English summaries p. 198. **DWB**—*Subject Headings:* **1. Terrestr magnetism 2. Observation techniques.**

10L–676 551.501.42:551.508.

Hsu, Ming-Tung (*Taiwan Weather Bureau, Taipei*), **Report on the comparison of barometer between Taipei and Tokyo.** *Geophysical Magazine*, Tokyo, 28(4):573–582, Sept. **1958.** 7 tabl 2 refs., eqs. **DWB, DLC**—In compliance with the letter dated March 25, 1957 issued by Dr. Mull, Chairman of Standing Working Group for Comparison of Barometers, RA II, China National Standard Barometer (C_6) is compared with Japan's Sub-Regional Standard Barometer (B_3). The mean correction of the National Standard C_6 in relation to Japan's Sub-Regional Standa Barometer B_3 is found $B_3 - C_6 = 0.01$ mb. *Subject Heading:* **1. Barometer corrections.**—*Autho abstract.*

10L–677 551.501.42:551.577.3:681.14

Kojima, T., **On the trial making of a slide rule for the return period.** *Journal of Meteorologic Research*, Tokyo, 10(7):610–612, July **1958.** 5 figs., 3 tables, 2 refs., 7 eqs. In Japanese. **DLC** The principle of a slide rule for the return period is that the annual maximum values of hourly ar daily rainfall are subject to logarithmic normal distribution. The derivation of distribution functio the scaling and usage of the slide rule, and comparison with other methods are given with diagram and equations. The slide rule gives the value of the return period having an accuracy of 3 significan digits using the mean value and standard deviation of the annual maximum values of hourly an daily rainfall. *Subject Headings:* **1. Rainfall recurrence computation 2. Slide rules.**—*J.H.W.*

10L–678 551.501.42:551.521.1

*Nessi, A., **Tables de calcul d'ensoleillement (lat. 30°N; 35°N; 45°N; 50°N).** [Tables fo calculating sunshine.] *Industries Thermiques*, Paris, 4(3):114–130, March **1958.** fig., 16 table 4(6):282–298, June **1958.** fig., tables; 4(8/9):394–410, Aug./Sept. **1958.** fig., tables; 4(10):446–46 Oct. **1958.** fig. tables. **DLC**—Tables of insolation for latitudes 30°N, 35°N, 45°N and 50°N applicable to the countries situated within latitudes 27°5–32°5 N; 32°5–37°5 N; 42°5–47°5 N; an 47°5–52°5 N, respectively. Each latitude gives for a specific month the cosine of the angle incidence either for a vertical wall (and a horizontal terrace), or for a roof having a pitch of 30°, 45 or 60°. *Subject Heading:* **1. Sunshine tables.**—*A.V.*

10L–679 551.501.42:551.554:551.511.

Petrov, V. E., **Privedenie skorosti vetra k vysote 2 m.** [Reduction of wind velocity t the 2 m level.] *Meteorologiia i Gidrologiia*, Leningrad, No. 11:28–30, **1958.** table, 3 refs 4 eqs. **DWB DLC**—Lakĭhtman's equation expressing the variation of wind velocity with height i $v = v_1 \frac{z^{1-n} - z_0^{1-n}}{z_1^{1-n} - z_0^{1-n}}$, where v = wind velocity of height z; v_1 = known velocity at height z_1 (height of vane) z_0 = measure of surface roughness; $1-n$ = power index, depending on atmospheric stability. At height of 2 m $1-n$ is close to zero so that $v = v_1 \frac{\lg(z/z_0)}{\lg(z_1/z_0)}$. For soil covered evenly with snow to depth of more than 10 cm, $z_0 = 0.05$ cm, for bare and smooth soils, for smooth snow cover of less than 10 cm, grass cover less than 5 cm, $z_0 = 1$ cm, and for soil with grass cover between 5 and 20 cm $z_0 = 3$ cm. Since v_1 can be obtained from monthly tables of meteorological observations or climatic summaries it is necessary to compute only the transformation multiplier in order to reduce wind velocity to 2 m so that the formula $k = \frac{\lg(z/z_0)}{\lg(z_1/z_0)}$ is obtained. In this formula $z = 2$ m, z_0 = a functior of surface, and z_1 = height of vane in m; the values of the multiplier are computed and presented in a table. *Subject Headings:* **1. Methods of computation 2. Wind velocity variations.**—*I.L.D.*

10L–680 551.501.42:551.509.312

*Rosini, Ezio, **Su una rappresentazione indicativa del campo normale delle tendenze barometriche in Italia.** [On an indicative representation of the normal field of barometric tendencies in Italy.] *Rivista di Meteorologia Aeronautica*, Rome, 18(1):28–34, **1958.** 3 figs., 2 tables. Italian, French English and German summaries p. 28. **DLC**—Italy is divided into 9 regions in which data on monthly mean 01, 07, 13 and 19h pressure tendency using 38 stations for 1949–53 are calculated and tabulated. Values are plotted in small maps which show the greatest plus and minus tendencies in winter in the extreme southeast and northwest and in summer in the extreme northeast of Italy.

gative tendencies predominate at 13h and to some extent at 19h; positive at 01 and less often at 1. *Subject Headings:* **1. Pressure change normals 2. Barometric tendency calculation 3. Italy.** *M.R.*

10L–681 551.501.42:551.54:551.55

*Schove, D. Justin, **The preliminary reduction of early barometric and wind data.** *International ion of Geodesy and Geophysics. Association of Meteorology, Brussels, 1951, Procès-Verbaux des nces, Mémoires et Discussions,* [pub. **1953**]. p. 193. eq. **DWB**—Observational errors are rrected with the help of wind and pressure deviation maps for a given year from a 3 or 10-yr mean that barometric records back to 1720 can be reconstructed. *Subject Headings:* **1. Long period cords 2. Barometric reduction of early data 3. Wind data.**—*A.A.*

10L–682 551.501.42:519.27

Schumann, T. E. W., **The adaptation of Wiener's theorem to a finite series.** *South Africa. eather Bureau, Notes,* 5(4):226–228, **1956.** ref., 24 eqs. **DWB**—Wiener's theorem, which states at for an infinite time series the spectral and auto correlation curves are Fourier transforms of each her, is proved to be valid also for a finite series, provided that autocorrelation is suitably defined. is shown that there are two possible definitions which lead to useful results. *Subject Headings:* **Methods of computation 2. Statistical analysis.**—*Author's abstract.*

10L–683 551.501.42:551.525.4:551.525.5

Shekhter, F. N., **Raschet glubiny promerzaniia pochvy i temperatury merzloi pochvy.** [Calcution of soil freezing depth and of the temperature of frozen soil.] *Leningrad. Glavnaia Geofizicheaia, Trudy,* No. 77:7–19, **1958.** 10 figs., 6 tables, 12 refs., 14 eqs. **DWB, DLC**—Previous formulas veloped for computing the relationship of depth of freezing of soil and its temperature to meteorogical conditions during the period of minimum snow cover or during its absence (*GGO, Trudy,* o. 53:115, **1955**) are utilized in this study to forecast the same values. In the earlier work the rmula was $y=\sqrt{\sigma t+y_0^2}$ where t = time of day, y_0 = initial depth of freezing in cm, σ = parameter haracterizing rate of freezing. If it is assumed that the initial freezing is absent and y_0 is regarded a heat insulating layer situated over frozen soil (analogous to snow cover) then the depth of freezing represented by $y=y_0+\sqrt{\sigma t}$. By making $\sigma=(y-y_0)^2/t$, it can be transformed into $1/(D+x)x[B/(C-x)x]+1$. This equation contains four dimensionless parameters, viz:

$$D=\frac{2d}{A},\qquad C=\frac{37\sqrt{t}}{A};\qquad B=\frac{\lambda_T}{\lambda}\frac{\theta_H-\theta_0}{\theta_0-\vartheta_m},\qquad x=\frac{y-y_0}{A},$$

here

$$A=\sqrt{\frac{2\lambda t(\theta_0-\vartheta_m)}{Lq}},\qquad d=\lambda\left(\frac{h}{\lambda^*}+\frac{y_0}{\lambda'}\right).$$

he formula for computing the depth of freezing soil is $y=xA+y_0$. The determination of the arameter x is accomplished by a series of nomograms which serve in solving in a most general way he equation for σ. (In the above equations λ' = heat conductivity of layer y_0; q = amount of water rozen in 1 cm³ of soil; L = latent heat of crystallization; ϑ_m = mean temperature of snow surface for me t; θ_H = temperature of melt water at depth H at initial moment; θ_0 = temperature of soil freezing; , λ^* = height and heat conductivity of snow cover. The equations for the parameters A, B, C and) are presented and the equation for computing the temperature of the frozen soil at any depth z is iven as $\theta(z)=y-z/[y+\lambda_m(h/\lambda^*)]\vartheta$. The determination of the amount of freezing water in the oil, and the conductivity of soil and snow with the aid of tables and graphs are discussed and illusrated. *Subject Headings:* **1. Soil freezing depth calculations 2. Frozen soil temperatures.**—*I.L.D.*

10L–684 551.501.42:551.524.36

Shibata, H., **On easy methods of calculation of accumulative air temperature.** *Japan. Meteorogical Agency. Tokyo, Memoirs of Industrial Meteorology,* 22(1):49–52, **1958.** 2 figs., 5 tables, eqs. In Japanese; English summary p. 52. **DLC**—First method is by using average daily mean temperature. The 365 values of average daily mean temperature have been listed in a column, starting with he highest value and progressing downward to the lowest. Then the list of values is subdivided into , 5 or 6 groups so that each group may have the same number of data. Using the bordering values f the groups, a figure showing an approximate relation between the temperature and the number of ays with that temperature or higher temperatures is easily obtained. Then the accumulated value f temperature (°C) for the days over 10°C is estimated. The error of this method is shown to be –2%, as compared with the value obtained directly from the average daily data. Second method is y using average monthly mean temperature. The accumulated value of temperature (°C) for the

days over 10°C was estimated from the figures showing the annual march of average monthly me air temperature. In this case the error is within 1%. *Subject Headings:* **1. Accumulated temper tures calculations 2. Air temperatures 3. Methods of computation.**—*Author's summary.*

10L–685 551.501.42:551.577

*Šimo, Eduard, **Poznámky k problému stanovenia priemernej výšky spadnutých zrážok v povo** [Notes on the problem of determining average precipitation amount in a catchment.] *Vodoh spodársky Časopis*, Bratislava, 3(3/4):145–166, **1955.** 11 figs., 11 tables, 20 refs. Russian a German summaries p. 165–166. **DLC**—A review of existing methods of computing areal precipitati averages, especially the methods of Z. I. Darman (U.S.S.R., 1949) and E. N. Whitney (U. S., 192 Advantages and disadvantages of each method, the effects of measurement errors, network densit etc., are discussed. Examples of areal rainfall computation are shown on data for Slovakia. *Subj Headings:* **1. Areal rainfall computation 2. Slovakia.**—*G.T.*

10L–686 551.501.42:551.547:534.321

*Spencer, N. W., **Table of pressure ratios P_i/P_c and P_c/P_a vs. Mach number for a 15° rig circular supersonic cone ($\gamma=1.405$).** Rev. from an earlier (1953) report. Michigan. Uni Research Institute, Contract AF 19(604)-1948, Scientific Report, No. ES-3, Sept. **1958.** 6 +numerous tables. 4 refs., 7 eqs. **DWB** (M08.4 M624sc)—This report presents a table of pressu ratios to be found on a 15° right circular cone tabulated vs. the free-stream Mach number. T pressure ratios are given to five significant figures against 0.001 increments of the argument. T argument ranges from $M_1=1.048$ to $M_2=3.895$. Given are the ratio of total head pressure P_i to t cone-surface pressure P_c and the ratio of the cone-surface pressure P_c to the free-stream stat pressure P_a. With these tables and two pressures on a right circular cone, it is possible to determi the free-stream Mach number and the free-stream static pressure. By measuring the free-strea velocity (or the velocity of the cone through the media if that is the situation) in addition, it possible to compute free-stream static temperatures and densities. *Subject Headings:* **1. Computati tables 2. Upper air pressure ratios.**—*Author's abstract.*

10L–687 551.501.4

*Split, Yugoslavia. Hidrometeorološki Opservatorij Marjan. **Meteorološke tablice.** [Met orological tables.] Split, Hidrografski Institut, Meteorološki Otsjek, **1945.** 58 p. entirely table **DWB**—Conversion tables are provided for reducing barometer pressure to 0°C temperature, to se level, to standard latitude, conversion of pressure (mm–mb and vice versa); pressure chang (mm–mb); temp. °F to C°, wind from miles to m/sec and km/hr and vice versa; and calculation relative humidity and vapor pressure from the dew point depression and dry bulb temperatur *Subject Headings:* **1. Meteorological tables 2. Conversion tables.**—*M.R.*

10L–688 551.501.42:529.7

Wörner, H., (*Met. Observatory, Potsdam*), **Die Umrechnung von Stundenmittelwerten eine meteorologischen Elements von wahrer Ortszeit in mittlere Ortszeit und umgekehrt.** [The cor version of hourly mean values of meteorological elements from true local time to mean local time an vice versa.] *Zeitschrift fur Meteorologie*, Berlin, 12(3):85–93, March **1958.** 3 figs., 2 tables, 3 refs 9 eqs. **DWB DLC**—The author derives equations for transforming the mean hourly values of meteorological variable from true local time to mean local time or vice versa. If the element bein recorded is a constant function of time $E=f(t)$ then the hourly sum $\bar{E}$ is given by $\bar{E}=\int_{t=0}^{t=1} Ed$ In the case of a record evaluated according to hourly intervals the table contains only the actual values for every hour. The hourly sum of the interval t_{n-1} to t_n is designated by $\bar{E}_n$. It is necessar to compute the value $\bar{E}_n$, originally calculated for $t=n-1$ to $t=n$, for a new interval $t=(n-1)+$ to $t=n+c$, whereby c is the temporal displacement of the new interval in relation to the original on The derived equation is $\bar{E}_n'=\bar{E}_n+(c/2)(\Delta^I{}_{n+0,5}+\Delta^I{}_{n-0,5})+(c^2/2)\Delta_n{}^{II}$, where Δ^I is the first differenc between adjacent $\bar{E}$-values, i.e., E is at the beginning of the interval at point t_n equal to the middl value of both adjacent integrals $\bar{E}_n$ and $\bar{E}_{n+1}$. With this formula the $\bar{E}$ values can be converte easily into the $\bar{E}'$ values when the actual first and second differences are formed for the $\bar{E}_n$-values c the table that is to be converted. The correction for sunshine records, set up without error, is give by equations:

$$\bar{E}_n'=\bar{E}_n+c\Delta^I{}_{n+0,5} \quad \text{for } c>0, \quad \text{and} \quad \bar{E}_n'=\bar{E}_n+c\Delta^I{}_{n-0,5} \quad \text{for } c<0.$$

Examples of the application of this method to the hourly totals of direct solar radiation in Potsdar and hourly means of air temperature in Potsdam, are presented. *Subject Headings:* **1. Conversio tables 2. Local time conversion equations.**—*I.L.D.*

METHODS OF AND TABLES FOR STATISTICAL COMPUTATION (551.501.45)

10L–689 551.501.45:519.24

Bagrov, N. A., **Analogichnost' poleĭ meteorologicheskikh elementov.** [Analogousness of the field of meteorological elements.] Moscow. *Tsentral'nyĭ Institut Prognozov, Trudy*, 46(73):40–52, 1956. 3 figs., 5 tables, 6 refs., 9 eqs. **DLC**—The author examines the analytical representation of the field of the meteorological elements in the form of polynomials of the second and third degree on horizontal coordinates x and y. The problems involve the determination of the coefficients a_0, a_1, a_2. The method for obtaining the coefficients and a table with these coefficients are presented. *Subject Heading:* **1. Statistical techniques.**—*I.L.D.*

10L–690 551.501.45.551.547.1

Chebotarev, Aleksandr Stepanovich, **Barometricheskie tablitsy i sposoby ikh primeneniia.** [Barometric tables and methods of application.] Leningrad, Goskartogeodeziia, **1932.** 24 p. tables, 2 eqs. At head of title: GGU VSNKH SSSR. Gosudarstvennyĭ Institut Geodezii i Kartografii. **DLC** (QC895.C45)—Detailed tables are presented for determination of heights by pressures (600–800 mm) and corrections for temperature (−5°C to 35°C) at various pressures (600 800 mm), plus interpolation and accessory tables such as the altitude effect on boiling point of distilled water, multiplication tables, etc. Detailed instructions are given for use of tables in aneroid altimetry (leveling). *Subject Headings:* **1. Barometric tables 2. Altimetry.**—*M.R.*

10L–691 551.501.45:519.241.6:621.317.7

Crain, C. M. and Hainey, M. F., (*Univ. of Texas, Austin, Texas*), **A simple device for finding the RMS value of recorded data.** *Review of Scientific Instruments*, 23(5):243–245, May **1952.** 4 figs., 3 eqs. **DLC**—The tedious work of analyzing the root mean square value of a wave form can be eliminated to a great extent by employing the integrating property of a watt-hour meter in a simple recording instrument that is described and illustrated. The degree of accuracy is satisfactory. *Subject Headings:* **1. Methods of computation 2. Root mean square computation.**—*W.N.*

10L–692 551.501.45:551.571

§Creswick, W. S., **An approximate method of charting precipitable moisture.** *Canada. Meteorological Div., CIR-2565*, TEC-199, Dec, **1954.** 4 p. 7 figs., 2 tables, 2 refs. **DWB, DLC**—A method of charting the field of precipitable moisture by using dew points on 850 mb and 700 mb constant pressure charts and taking account of surface elevations is proposed. An example of the method is shown and compared with other methods of obtaining the same chart. *Subject Heading:* **1. Precipitable water charts 2. North America.**—*Author's abstract.*

10L–693 551.501.45:551.552:551.542.1

Drogaĭtsev, D. A., **Uchet krivizny izobar pri postroenii poleĭ vetra.** [Calculating the curvature of the isobar in constructing a wind field.] *Meteorologiia i Gidrologiia*, No. 11:29–32, Nov. **1956.** 1 fig. (nomogram), 3 refs., 12 eqs. **DWB, DLC**—The author attempts to set forth the conditions in which it is necessary to calculate the curvature of the isobars when wind fields are calculated over seas, and how to calculate this element. In systematic calculations of wind fields the geostrophic wind velocities in a quadrant are first calculated and then the isobaric curvature is computed. The equations are developed, computing corrections for isobaric curvature, for measuring the radius of curvature and for computing the gradient wind. A nomogram for calculating the gradient wind is constructed and its use is illustrated. *Subject Headings:* **1. Wind field calculations 2. Curvature of isobars 3. Gradient wind nomograms.**—*I.L.D.*

10L–694 551.501.45:551.577

Ekhart, E., **Zur Anomalienmethode.** [On the method of anomalies.] *Archiv für Meteorologie, Geophysik und Bioklimatologie, Ser. B*, 4(3):311–316, **1953.** 9 refs. German, English, French summaries p. 275.—Answers criticisms by H. Uttinger (*see* 3.2–147, Feb. 1952, *MAB*) of Ekhart's paper on rainfall anomalies in the Alps (*Geografiska Annalen* 1948:728–739). *Subject Heading:* **1. Rainfall data analysis.**—*C.E.P.B.*

10L–695 551.501.45:519.2

Ekman, V. Walfrid, **On the determination of variable mean values.** (In: **Festskrift tillägnad Vilhelm Bjerknes den 14 Mars 1942.** Stockholm, Centraltryckeriet, **1942.** p. 75–78. 2 figs., 1 foot-refs.) **DWB**—Procedures and accuracy of graphical smoothing of time series not yet completed by the technique of progressive mean values with an example from oceanography for obtaining time graphs of 3-hourly data with a variable mean. The use of a larger number of values (8 a day instead of 5) does not necessarily improve the smoothed averages. Using one curve for the 8-a-day and

another for the 5-a-day values gives different curves which can aid the analyst in obtaining a bett average curve than would be the case if either (but only one) set of data were used. *Subject Heading* **1. Methods of computation 2. Variable mean value computation.**—*M.R.*

10L–696 551.501.45:519.

Freeman, John C., Jr. and Baer, Ledolph, **Pseudo-characteristics.** *American Geophysic Union, Transactions*, 38(1):65–67, Feb. **1957.** fig., 3 refs., 11 eqs. **DWB, DLC**—The speud characteristics are defined as the lines along which the dependent variables in nonhomogeneo equations have the same relationship as the similar variables in the corresponding homogeneo equations. A sample computation of water levels caused by wind stresses, using the pseudo-chara teristics, is included. *Subject Headings:* **1. Methods of computation 2. Statistical methods hydrology.**—*Authors' abstract.*

10L–697 551.501.45:551.5

Hejjas, Endre, **Una regla de cálculo para determinar el punto de rocio.** [Rule of calculation f determining the dew point.] *Mendoza, Argentina. Universidad Nacional de Cuyo. Departamen de Investigaciones Científicas, Anales*, 1(2):121–124, **1953.** 2 figs., eqs. Spanish, English ar German summaries p. 121. **DWB**—For calculating dew point from the psychrometric tables th author presents a nomogram which is a simple substitute for the complicated tables. Examples computations are given. *Subject Headings:* **1. Dew point calculation 2. Nomograms.**—*I.L.D.*

10L–698 551.501.45:632.187(94

Hickman, J. M., **The application of the Luke system to fire weather in Tasmania.** (In: Fi Weather Conference, Melbourne, Australia, July 1958, **Proceedings,** issued Melbourne, **1958** Conference Paper, No. 9 [13 p.] 2 figs.) (Reprinted by courtesy Tasmanian Forestry Commission **DWB**—The present instruments and statistical methods used for evaluating fire danger tables hav not proven satisfactory for conditions in Tasmania. The Canadian Forest Service list of meteor logical factors developed for such a purpose has failed even though it has been successfully applied i other areas. This report discusses the Luke index which has been used in the area with substanti modification, both in relative values of meteorological parameters and in the method of assessing th fuel state. During the 1955/56 fire hazard season in Tasmania the predominant moist southeaster weather reduced the fire hazard in the western district. Little normal westerly weather was exper enced. Wind reactions and rainfall accounts during the season are discussed. It is concluded that th Luke system overrates temperature and underrates wind effects. *Subject Headings:* **1. Methods c computation 2. Fire danger rating 3. Luke index 4. Tasmania, Australia.** *N.N.*

10L–699 551.501.45:517.512.2:518.

Ishiguro, Shizuwo, **A graphical analyzer for irregular waveforms.** *Oceanography and Meteorolog* Nagasaki, 5(1/2);33 35, June **1951.** 3 figs., refs. In Japanese; English summary p. 35. **DWB**— An apparatus developed by the author is capable of dividing a curve traced by a recording instru ment into two or more component curves. It can also combine several curves into a single one. Th apparatus was designed for the purpose of analyzing records of secondary oscillations of tides but i can be used for other purposes involving graphic records, e.g. in connection with a Fourier's series o moving averages. The structure of the device is described and illustrated by diagrams. *Subjec Headings:* **1. Harmonic analysis 2. Methods of computation.**—*G.T.*

10L–700 551.501.45:519.

Kivéliovitch, M., **Un nouveau test pour l'étude des séries chronologiques.** [New test for th study of chronological series.] *Journal Scientifique de la Météorologie*, Paris, 9(33):15–18, Jan./March **1957.** 2 refs., eqs. French, English and Spanish summaries p. 15. **DLC**—The "intersection test' described earlier (*see* 8.8–117, Aug. 1957, *MAB*) is applied to each individual phase of a chronologica series. *Subject Headings:* **1. Statistics in climatology 2. Series analysis.**—*Author's abstract.*

10L–701 551.501.45:551.583

Kivéliovitch, M. and Vialar, J., **Tests améliorés pour l'étude statistique des séries chrono logiques.** [Improved tests for the statistical study of chronological series.] *Journal Scientifique de l Météorologie*, Paris, 9(36):147–154, Oct./Dec. **1957.** 9 refs., 13 eqs. English and Spanish summarie p. 147. **DWB**—The authors suggest an improvement of the "maxima and phases tests" previously indicated and give two examples for applying the improved tests. *Subject Headings:* **1. Statistics in meteorology 2. Climatic variations.**—*Authors' abstract.*

10L–702 519.24:551.501.45

Kivéliovitch, M., **Séries chronologiques: Quelques nouveaux tests quantitatifs.** [Chrono logical series: some new quantitative tests.] *Journal Scientifique de la Météorologie*, Paris, 10(39)

5–120, July/Sept. **1958.** ref., eqs. French, English and Spanish summaries p. 115. **DWB**—The hor continues his previous researches on the chronological series. In this paper he develops a tain number of quantitative tests which are designed to decide whether a chronological series is andom" or "organized." *Subject Headings:* **1. Chronological series 2. Statistical tests of time ies.**—*Author's abstract.*

10L–703 551.501.45:551.577:551.43

Lebin, A. G. and Miachikov, V. D., **K opredeleniiu sloia osadkov v gornykh raïonakh no metodu . A. Alekseeva."** [Determination of precipitation layers in mountain regions according to the thod of G. A. Alekseev.] *Meteorologiia i Gidrologiia*, Leningrad, No. 2:39–41, Feb. **1956.** 2 figs., efs. **DWB, DLC**—G. A. ALEKSEEV's method for determining the layer of precipitation as a function of parameters determined from the data of weather stations which can be interpolated geographically and for which cartograms can be constructed. But in mountain regions, tables cannot be nstructed by interpolation only for the vertical zonation of such factors as total number of days th rain, or average annual summer rainfall. The determination of these elements for mountainous gions of Northeastern U.S.S.R. is discussed and their use is illustrated. *Subject Headings:* **1. Preipitation calculations 2. Mountain regions 3. Northeastern U.S.S.R.**—*I.L.D.*

10L–704 551.501.45:519.241.1

Levert, C., (*Koninklijk Nederlands Met. Inst. DeBilt*), **Theoretical objections against Pearson's le of thumb on estimating the significance of a correlation coefficient.** *Archiv für Meteorologie, ophysik und Bioklimatologie, Ser. B*, Vienna, 9(2):238–243, **1958.** fig., table, 4 refs., eqs. English, rman and French summaries p. 238. **DWB, DLC**—V. CONRAD in a brief note on estimating the nificance of a correlation coefficient, pays attention to Pearson's rule of thumb: "The correlation efficient r is significant if it is, at least, six times its probable error." The present author studies the eoretical and mathematical background of the rule. The conclusion is that the rule is open to estion. Although it is possible to correct it in accordance with the modern statistical point of w, it is better (especially if $n < 60$) to use the exact correlation tables. A diagram and a numerical ample illustrate the text. *Subject Heading:* **1. Computation of correlation coefficients.**—*Author's mmary.*

10L–705 551.501.45:551.554:551.43

Lorenz, Edward N., **Method for computing the mountain torque.** (In: Massachusetts Institute Technology. Dept. of Meteorology, Contract AF 19(122)-153, Studies of the Atmospheric neral Circulation, Final Report, Pt. 1, May 31, **1954.** p. 72–74. 7 refs., 2 eqs.)—Shows that ountain torque p can be computed by means of two constants A and B introduced in the pressure

stribution: $p = \sum_{i=1}^{n} (A_i P_{0i} + B_i P_{1i})$, where i = grid points, P = pressure at different levels for a given

titude. These constants can be computed once for all future cases. *Subject Headings:* **1. Mountain rque 2. Wind field calculation.**—*A.A.*

10L–706 551.501.45:551.524

Makjanić, Berislav, **Kako računati dnevni srednjak temperature zraka?** [How to compute ily mean atmospheric temperature.] *Yugoslavia. Hidrometéorološka Sluzba, Vesnik*, 3(3/4):80–85, ly/Dec. **1954.** fig., 7 tables. **DWB**—Problems in calculating frequencies of deviation from normal mperature are treated in connection with the two different approaches to temperature normals dissed in Pt. 1 of this article. (For Pt. 1 *see* 6.2–30, Feb. 1955, *MAB.*) *Subject Headings:* **1. emperature deviations 2. Temperature averaging.**—*G.T.*

10L–707 551.501.45:551.571

Mrose, Helmut (*Friedrichsroda in Thüringen*), **Ein Psychrometer-Auswertgerät zur raschen estimmung des Taupunktes.** [A psychrometer evaluating apparatus for quick determination of w points.] *Wetter und Leben*, 4(5/7):104–106, July **1952.** fig. **DLC**—Description of a simple ide rule for the computation of the dew point, especially suitable for mountain stations, where a ight correction is necessary. *Subject Headings:* **1. Slide rules 2. Dew point calculation.**—*A.A.*

10L–708 551.501.45:519.241.1(52)

Nagao, T., **Structure of action front (1).** *Journal of Meteorological Research*, Tokyo, 3(13): 58–466, Nov. **1951.** 10 figs. In Japanese; English summary p. [29].—In this paper the author efined the concept "action front" to be the area of small standard deviation, and found the action ront to have the following characteristics (concerning temperature and pressure): 1. Type of

variation of monthly mean value differs on both sides of the action front. 2. Autocorrelation coe cient approaches zero over the action front. 3. In the region apart from action front the autocorre tion coefficient is nearly constant. 4. The equal distance correlation between the two points ne action fronts is smaller than that of the other case. 5. Abnormal weather or *Witterung* has a cl relation to action front. 6. Meaning of correlations calculated by many meteorologists becom clear by using the above concept. *Subject Headings:* **1. Pressure variations 2. Temperatu variations 3. Correlation coefficients.**—*Author's abstract.*

10L–709 551.501.45:551.577.31(5

*Narasimhan, V. L. and Zafar, Md., **Analysis of the hourly rainfall records at Poona.** *Ind. Meteorological Dept., Scientific Notes*, 9(110):93–110, **1946.** 4 figs., 11 tables, 3 refs. **DWB**—T hourly rainfall at Poona during the 10 yrs 1930–1939 has been analyzed; the frequency distributi of different amounts, the diurnal variation of rainfall and the distribution of rainfall with surfa and upper winds from different directions have been studied. The frequencies of hourly falls, wh classified in steps of 5 one hundredths, 0.01″ to 0.05″ to 0.10″ etc., yield a pronouncedly L-shap curve, the mode being in the first class 0.01 to 0.05″. The characteristic feature of the diurnal var tion of rainfall is a marked increase in the afternoon hours of both the rainfall amounts and occasio of rainfall in all the months except July and August, when the monsoon is strong. The directic associated with the maximum rainfall are E to NE during the cold weather, SE in the hot weath W to SW in the southwest monsoon, and W to SW as NE to E in the retreating monsoon seas Rainfall is found to be most frequent in the cold weather with winds from NE (just opposite to t prevailing direction), with winds from SE to E as also from SW to W during the retreating monso During the cold weather a backing of the wind from the prevailing direction at 2.3 and 4 km, favorable for rain. During the hot weather a veering of the wind from prevailing direction at 2 k and a backing at 3 and 4 km is favorable for rainfall. The rainfall is mostly associated with t prevailing winds from W in the first 2 km, and with easterly winds at 4 km. In the intermedia level of 3 km both westerly and easterly winds are favorable. In the retreating monsoon the p vailing direction seems to be favorable. *Subject Headings:* **1. Rainfall data analysis 2. Long peri rainfall data analysis 3. Diurnal rainfall variations 4. Poona, India.**—*Authors' abstract.*

10L–710 551.501.45:551.583.

Péczely, György, **Tartamvalószínüségek vizsgálata.** [Analysis of probabilities of persistence *Időjárás*, Budapest, 61(4):245–252, July/Aug. **1957.** 2 figs., 7 tables, 4 refs., eqs. Russian summa p. 245. German transl. p. 307–313. **DLC**—Probabilities of persistence of temperature, precipit tion and wind conditions are derived from records of Hungarian stations. A method is develope whereby the probabilities derived from actual observations are compared with those of a rando distribution and the relation thus obtained is used as a climatic index. The method is applied temperature data for 53 stations over the Northern Hemisphere. Lines of equal persistence anom lies are drawn on polar maps of the Northern Hemisphere. *Subject Headings:* **1. Persistence prob bilities 2. Northern Hemisphere.**—*G.T.*

10L–711 551.501.45:551.521.3:551.593

Penndorf, Rudolf B., (*AVCO Manufacturing Corporation, Boston*), **New tables of total M scattering coefficients for spherical particles of real refractive indexes ($1.33 \leq n \leq 1.50$).** *Optic Society of America, N. Y., Journal*, 47(11):1010–1015, Nov. **1957.** 5 figs., 2 tables, 8 foot-ref 7 eqs. **DWB, DLC**—Extensive computations of the total Mie scattering coefficient K have bee carried out using IBM 701 electron data processing machine. The detailed results show the natu and the complexity of the scattering. The results of the computations are considered correct to significant figures and are listed in tables. *Subject Headings:* **1. Methods of computation 2. Scatte ing coefficient 3. Refractive index.**—*N.N.*

10L–712 532.5:551.501.45:551.579

Philip, J. R., (*Div. of Plant Indust., C. S. I. R. O., Deniliquin, N. S. W.*), **An application of th diffusion equation to viscous motion with a free surface.** *Australian Journal of Physics*, Melbourn 9(4):570–573, Dec. **1956.** 3 figs., 2 refs., 3 eqs. **DLC**—It is shown mathematically and graphicall how a viscous translatory wave flows over (1) a smooth dry horizontal surface, (2) a densely vegetate dry horizontal surface with K = the permeability of the vegetation constant, and (3) same wit $K = ky$ (height-variable permeability) where density of vegetation decreases with height. Case (is intermediate between (1) and (2). The equations are useful in flood or irrigation hydraulics whe a numerical solution of concentration dependent diffusion is applicable. *Subject Headings:* **1. Flui flow over vegetated ground 2. Vegetation influences on floors 3. Diffusion equations 4. Hy draulics 5. Flood wave analysis.**—*M.R.*

10L–713 551.501.45

Prandtl, Ludwig, **Zur Berechnung des Wetterablaufs.** [Calculation of weather processes.] *ademie der Wissenschaften in Göttingen, Math. Phys. Klasse, Math.-Phys.-Chem. Abt., Nachrichten,* :102–105, **1946.** 7 eqs. **DLC**—A method for calculating the development of the pressure and ocity field in case of slow changes is given. The differential equations can be integrated only by ans of iterations. *Subject Headings:* **1. Dynamic meteorology 2. Methods of calculation. Ertel, H.**—*A.A.*

10L–714 551.501.45:551.525.5

Rowland, E. F.; Stolzy, Lewis H. and Crabb, George A., Jr. (*all, Dept. of Agriculture*), **Frost termination by electrical resistance.** *National Research Council, Wash., D. C., Highway Research ard, Bulletin,* No. 100:17–21, **1954**(?). 4 figs., 7 refs. (incl. foot-ref.). Also: Crawford, Carl B., scussion. *Ibid.*, p. 20–21. **DLC**—A preliminary report on a new method of determination of frost the soil profile in situ. The method involves interpretation of electrical resistances obtained with soil moisture block and their associated soil temperatures, a method developed at the Michigan ydrologic Research Station as a result of correlations noted from daily field records of soil moisture d temperatures. A hypothesis relating these phenomena was formulated and was substantiated field and laboratory studies. Under certain conditions an abrupt 200 ohm increase in the electrical sistance of the plaster of Paris moisture unit was a satisfactory indicator of the commencement of ystallization of moisture. Test instrumentation and graphic results of the laboratory tests are ustrated. *Subject Headings:* **1. Frozen soil measurements. I. Crawford, Carl B.**—*Authors' stract.*

10L–715 551.501.45:551.506.1:681.177(81)

Servicos Hollerith, s.a. Instituto Brasilerio de Mecanização, Rio de Janeiro, **Aplicação do stema Hollerith as apuracoẽs meteorológicas.** [Application of the Hollerith system to meteoro- gical computations.] [n.d.] 9+p. **DWB**—Data of meteorological observations received from stations in Brazil are integrated and analyzed by means of punched cards. As a result of the alysis, climatic tables are computed. This report contains a complete description of all details volved in the operation. Sample punched cards and climatological tables are included. *Subject eadings:* **1. Punched card analysis 2. Hollerith machines 3. Climatic tables 4. Brazil.**—*G.T.*

10L–716 551.501.45

*U. S. Advisory Committee on Weather Control, **Tables for transformation of a unit scale gamma riate to a unit scale normal variate with zero mean.** Issued by the Committee, July **1956.** 38 p. tirely tables, 3 refs. **DWB** (518 U581t)—Extensive computation tables intended for transforming dividual storm rainfall series to normal. The tables were prepared by plotting values from earson's tables and extending them and interpolating, checking, etc. No errors >0.01 were found t for $X's > 0.1$, but errors as high as 0.02 in t might be found in $X's < 0.1$. The first tables were epared by H. C. S. Thom in 1950 and these were expanded in 1955 by Franklin Newhall, and ere recomputed by Kasinoff and Vestal. *Subject Headings:* **1. Gamma variate tables 2. Hydro- eteorological computation tables. I. Thom H. C. S. II. Newhall, Franklin III. Kasinoff, laurice IV. Vestal, Ida.**—*M.R.*

10L–717 551.501.45:551.577.2(87)

*Vandellos, Sola José A., **Estudio sobre la pluviometría en Venezuela.** [Studies on rainfall in enezuela.] *Cuadernos Verdes,* No. 25, Caracas, **1945.** [This study was prepared for the 3rd onferencia Internamericana de Agricultura, Caracas, 1945.]—A detailed analysis of the rainfall Venezuela as a whole and of individual stations. The annual and secular variations and the lationship between temperature and rainfall are discussed. Tables give monthly rainfall in aracas for the period 1891–1943, in Valencia for 1901–1943, Maracaibo for 1911–1943, Merida for 921–1943, etc. *Subject Headings:* **1. Rainfall data analysis 2. Rainfall variations 3. Long period ecords 4. Venezuela.**—*I.L.D.*

10L–718 519.24 551.501.45

Veselý, Emil, **Výočet trendů v praxi.** [Practical calculation of trends.] *Meteorologické Zprávy,* rague, 5(1):23–29, **1952.** 2 figs., 8 refs., 12 eqs. **DLC**—Trends inherent in curves of statistical alues may be represented by drawing a median "optical" line, but such a procedure is too subjective nd has been proven extremely inaccurate. The author presents three formulas for computing lines statical trends numerically: (1) $y_a = a_1x + a_0$, (2) $y_b = b_2x^2 + b_1x + b_0$, and (3) $y_c = c_3x^3 + c_2x^2 + c_1x + c_0$. he first formula gives a linear trend, the second and third formulas give parabolic curves. The umerical operations involved are explained in detail and applied to two examples (annual totals of recipitation for Prague for the periods 1934 1950 and 1933–1950). *Subject Headings:* **1. Statistical echniques 2. Methods of computation 3. Statistical trends.**—*G.T.*

GRAPHIC METHODS OF PRESENTATION (551.501.5)

10L–719 551.501.5:51

Adams, Douglas P. and Evans, Howard T., Jr., **Developments in the useful circular nomogra** *Review of Scientific Instruments*, 20(3):150–155, March **1949.** 13 figs., ref., 7 eqs. **DLC**—T particular type of alignment for the function $UV = W$ in which the U and V scales lie on the circu ference of the same circle and the W scale along a diameter is developed in detail. The forms of t diagram for which certain intervals on these scales are maximized in their spread are derived a described. Such maximized diagrams, it is found, have certain characteristic properties of symmetr These developments are illustrated with examples. *Subject Heading:* **1. Nomograms.**—*Autho abstract.*

10L–720 551.501.5:551.571(469

Agostinho, José, **Diagrams climáticos.** [Climatic diagrams.] São Miguel, Azores, **194** 16 p. diagrs., tables. **DWB**—Climatic diagrams are presented, and their construction and u discussed, based on average monthly or annual temperature, relative humidity and precipitation f stations in the Azores and for Lisbon. One simple climatic diagram is based on plotting me relative humidity against mean absolute humidity for 5 different stations. Data on which the climagrams are based are presented. Purpose of presentation is for study of crop growth or diseas which depend on humidity. *Subject Headings:* **1. Humidity effects 2. Climagrams 3. Azor** —*M.R.*

10L–721 551.501.5:621.317

Cassinis, R., **Un criterio pratico di transformazione fra diagrammi di resistività apparen ottenuti con differenti dispositivi.** [A practical method for the reduction of apparent resistivi diagrams obtained with different instruments.] *Annali di Geofisica*, Rome, 11(3/4):233–23 Aug./Oct., **1958.** 2 figs., 3 refs., 3 eqs., English and Italian summaries p. 236. **DWB, DLC**— rapid method is proposed to transfer the observed resistivity curves obtained with any electro configuration into Schlumberger diagrams. Such procedure is of practical application even solving the field problem of fitting the different sections of the diagrams, when the distance betwe the voltage electrodes changes. *Subject Headings:* **1. Graphic presentation 2. Schlumberg diagrams.**—*Author's abstract.*

10L–722 551.501.5:551.511(0

Crocker, A. M., **Everyday uses of the tephigram.** *Canada. Meteorological Division Circul* 2256, Tec. 153, March 12, **1953.** 8 p. 5 figs. **DWB**—A new type of tephigram has been introduc in the Canadian Meteorological Service. In view of its slightly unfamiliar appearance some chara teristic curves are presented and discussed. Examples are given for use in frontal and air ma analysis, stability analysis, hodograph analysis, uses of the 1000 mb nomogram and use of the teph gram for checking the heights of pressure levels other than 1000 mb. *Subject Headings:* **1. Teph grams 2. Manuals 3. Canada. Meteorological Division.**—*G.T.*

10L–723 551.501

De Boer, H. J., **On graduation of data.** *Indonesia.* (*K.*) *Magnetisch en Meteorologisch C servatorium te Batavia, Verhandelingen*, No. 33, [**1948**]. 20 p. 10 refs., 55 eqs. **DWB**—An e tensive mathematical study (prepared for meteorological needs) on the smoothing of a series values, affected by random errors. The process of linear combination of several adjacent valu is called by the author the "graduation of data." The general solution of this problem is analyzed means of a newly introduced "smoothing coefficient" (ratio in which the graduation formula dimi ishes the mean error). A series of practical formulas is developed. *Subject Headings:* **1. Statistic techniques 2. Data smoothing techniques.**—*A.A.*

10L–724 551.501.5:518

Fischer, Johannes, **Über eine, "nicht nomographierbare" Funktion.** [A "non-nomographabl function.] *Acta Hydrophysica*, Berlin, 2(1):5–9, **1954.** fig., 10 refs., 10 eqs. **DLC**—Shows how construct a nomogram for equations of the type $W + (u/2) - P(u/2)^2 - V = 0$. *Subject Headin* **1. Nomograms.**—*A.A.*

10L–725 551.501.5:551.5

Gerson, Nathaniel Charles, **Tephigram—1050 mb to 300 mb—theory and construction.** Oct. **1944.** 167 p. 11 figs., 7 tables, eqs. Photostat of manuscript. **DWB**—Detailed instructio for the calculator and draftsman. The U. S. ICAN and British Aeronautic standard atmospher are compared. *Subject Headings:* **1. Tephigrams 2. Manuals.**—*A.A.*

10L–726 551.501.5:551.511.6:551.510.42

Gifford, Frank, Jr. (*U. S. W. B., Oak Ridge, Tenn.*), **Alignment charts for shape parameters of atmospheric diffusion and deposition patterns.** *U. S. Atomic Energy Commission, ORO*, No. 176, Sept. **1958.** 8 p. 5 figs. (2 fold. in pocket). Price: $.50 from Office of Technical Services, Wash., D. C. **DWB** (M10.721 G458aL)—Rosinski, in the 1958 ARF Project C 119 of the Armour Research Foundation, presented a series of 66 graphs that contained plots of four shape parameters on atmospheric diffusion and fallout computations. These 66 graphs have been re-used to form only 4 alignment charts in this communication. The construction and the principles upon which these charts are based are discussed. *Subject Headings:* **1. Graphic presentation 2. Atmospheric diffusion calculation 3. Radioactive fallout computation.**—*N.N.*

10L–727 551.501.5:551.511(02)

*Godson, Warren Lehman, **New Canadian tephigram.** *Canada. Meteorological Division Circular* 2237, Tec. 140, Jan. 26, **1953.** 41 p. numerous tables, diagr., eqs. **DWB**—The basic features of the new Canadian tephigram are described briefly. Procedures for computation or checking of heights of mandatory or arbitrary pressure levels are outlined, including the use of the 1000 mb nomograms and thickness scales. Additional features outlined include the hodograph form, area-energy relationships, data for the new ICAO Standard Atmosphere, and conversion of dew to frost point. In a number of theoretical appendices the theory of the 100 mb nomogram, the theory of the modified Väisälä thickness technique, the derivation of a precise technique for obtaining the virtual temperature increment as a function of dew point, the computation of saturation mixing ratio isopleths and of saturation pseudo-adiabats (with tabulated data) and computations based on the new ICAO Standard Atmosphere (with compilations) are outlined. *Subject Headings:* **1. Tephigrams 2. Manuals 3. Canada. Meteorological Division.**—*Author's abstract.*

10L–728 551.501.5:551.521.1

Hart, Samuel A. (*Member ASAE*), **An orthographic projection method for approximating the radiation shape factor.** *American Society of Agricultural Engineers, Transactions*, 1(1):12–14, **1958.** 7 figs., table, 9 refs. **DWB**—A graphical method of determining the radiation shape factor of the surrounds to a point source is given. The method is not laborious, is sufficiently accurate and provides a visual solution. *Subject Headings:* **1. Graphic presentation 2. Radiation shape factor.**—*Author's abstract.*

10L–729 551.501.5

Matschinski, Matthias, **Phénomènes des fluctuations en météorologie: une methode simple de leur description.** [Fluctuation phenomena in meteorology: a simple method of describing them.] *Journal Scientifique de la Météorologie*, Paris, 8(30):61–65, April/June **1956.** 4 figs., 7 refs. French, English and Spanish summaries p. 61. **DLC**—According to a graphic method described earlier, fluctuation phenomena can be conveniently illustrated by means of an ellipse whose axes and inclination represent values characterizing the set of data to be presented. In this paper the ellipse method of presentation is applied to various meteorological factors, such as visibility, wind, turbulence, etc. The method is applicable to coded messages and weather charts. *Subject Headings:* **1. Graphic presentation 2. Ellipse method of data presentation.**—*G.T.*

10L–730 551.501.5:551.579.5(540)

Mohan, Dinesh and Goel, R. K. (*both, Central Guilding Research Institute, Roorkee*), **Rapid methods for determining liquid limit of soils.** *Journal of Scientific and Industrial Research*, New Delhi, Sec. A, 17(12):498–501, Dec. **1958.** 4 figs., 2 refs., 2 eqs. **DWB, DLC**—Two simple graphic methods for the rapid determination of the liquid limit of Indian black cotton soils are described. One method involves the use of a nomographic chart and the other employs a parallelogram chart from both of which the liquid limit can be directly read off. The values obtained by these two methods compare well with those obtained by the conventional method. *Subject Headings:* **1. Soil moisture measurement techniques 2. Graphic presentation 3. India.**—*Authors' abstract.*

10L–731 551.501.5:519.24

Ogawara, M. and Yamazaki, H. (*Meteorological Res. Inst., Tokyo*), **Statistical method of estimating isolines.** *Papers in Meteorology and Geophysics*, Tokyo, 3(2):77–93, Aug. **1952.** 7 figs., 5 tables, 3 refs.—In this paper, it is pointed out that the so-called objective method of drawing isolines which is based on the method of least squares can be generalized but that it is disadvantageous in practice. As an alternative, a method based on the simultaneous confidence region of true value at each station is proposed. The method is developed for two cases; the one concerns the distribution of mean values and the other the directly observed values. In the former the only assumption is that every set of random fluctuation of simultaneously observed values submits to the same multivariate normal probability distribution law, and in the latter the assumption that the covariances

of observed values must be added. *Subject Headings:* **1. Isopleths 2. Statistical techniques.**—*Authors' abstract.*

10L–732 551.501.5:551.511:551.558

Pietrzyk, Alicja, **Próba ustalenia ilości energii powietrza zamienianej na energię ruchu.** [Experiment to determine the amount of potential energy in the air which is transformed into energy of motion.] *Poland. Panstwowy Instytut Hydrologiczno-Meteorologiczny, Wiadomosci Sluzby* 5(1):25–30, **1955.** 3 figs., 7 tables, 6 refs., 5 eqs. Russian and French summaries p. 30. **DLC**—A paper in which the method of calculating the speed of vertical currents by means of STÜVE diagram modified by P. DEMIANCHUK is presented. It is an experimental study of the dependence between actual speeds of glider ascents, supplied by pilots, and calculated speeds. It has been established that above cloud base the virtual speed of glider ascents amounts to 20–30% of the calculated speed and is about 30% in the clouds. *Subject Headings:* **1. Vertical current velocity calculations 2. Stüve diagram.**—*A.M.P.*

10L–733 551.501.5:551.521.1

*Pleijel, Gunnar (*Stockholm*), **Soldiagram, skärmdiagram och himmelsljusdiagram för Sverige.** [Sun diagram, shadow diagram and sky radiation diagram.] *Tekniska Skrifter*, Stockholm, No. 118, **1945.** 20 p. 15 figs., 2 tables. In Swedish; English summary p. 20. **DLC**—The method of constructing sun path diagrams and shadow diagrams which are useful in determining solar time for windows, balconies, etc. is described. Nine sun path diagrams, one for every second parallel, are presented. A shadow diagram for calculating the shadowing effect of a building has been constructed and an example of the use of the sun path and shadow diagram is given. Using the sun path diagram and cloudiness data the author constructed diagrams showing the intensity of diffuse sky illumination; it is expressed as intensity of illumination on a horizontal surface at 45° solar altitude and zero cloudiness. The formulas for calculating the sky illumination intensity, a diagram for calculating the intensity of solar radiation on a surface perpendicular to the sun's rays and a table giving % of sunshine for several localities in Sweden are given. *Subject Headings:* **1. Sun diagrams 2. Sun's shadow diagrams 3. Radiation on vertical surfaces 4. Illumination intensity 5. Sweden.**—*I.L.D.*

10L–734 551.501.5:551.511

Ray Choudhuri, S. N. (*Met. Office, Poona, India*), **On the analysis of thermodynamic diagrams for instability.** *Indian Journal of Meteorology and Geophysics*, 3(2):91–100, April **1952.** 2 tables, 16 refs., 4 eqs.—Modified parcel method discussed, taking into account the entrainment of environmental air by the cloud air. Estimation methods of the total instability are examined for Indian conditions. *Subject Headings:* **1. Tephigram analysis 2. Instability 3. India.**—*A.A.*

10L–735 551.501.5:551.511:551.521.16(485)

Refsdal, Anfinn, **Aerological diagram papers [after 1937].** At head of title page: U. S. Naval Academy, Postgraduate School. 27 p. 13 figs., 37 eqs. Translation of Pt. I of his **Aerologische Diagrammpapiere** from *Geofysiske Publikasjoner*, [Oslo], 11(13), **1937** (*see* 2D–123, April 1951; *MAB.*) **DWB**—A translation into English of this classical paper wherein the author presents a type of aerological diagram paper facilitating solenoid calculations according to V. BJERKNES, energy calculations according to MARGULES and SHAW, height calculation, calculation of specific volume and equivalent temperatures and the calculation of characteristic curves according to ROSSBY. *Subject Headings:* **1. Aerograms 2. Aerological diagrams 3. Rossby diagram 4. Thetagrams.**—*A.A.*

10L–736 551.501.5:551.509.25

Smith, C. D., Jr., **A test of three of Scherhag's rules for prognostic chart construction.** Nov. 29, **1951.** 4 p. 7 figs., 5 refs. Photostat of typescript. **DWB**—Three rules given by SCHERHAG for 24 hr pressure change areas are tested for the weather conditions in North America, using a very limited number of cases. The agreement was weak and for one case even reverse, observing more pressure increases in a delta region than decreases. *Subject Headings:* **1. Objective forecasting 2. Scherhag's theory 3. Prognostic charts. I. U. S. Weather Bureau.**—*A.A.*

10L–737 551.501.5:551.524.34(498)

Ţîştea, D., **Calculul temperaturilor medii decadice plurianuale după metoda grafică (histograme) a lui A. A. Şhepelevski la staţiile din R.P.R.** [The long period decadal mean temperature in Rumania computed according to the graphic method (histograms) of A. A. Shepelevskiĭ.] *Meteorologia, Hidrologia si Gospodarirea Apelor*, Bucharest, 3(4):16–18, **1958.** fig., table, refs. Russian summary p. 75, French summary p. 77, and English summary p. 79. **DWB**—A theoretical presentation of the methods of histograms by A. A. SHEPELEVSKIĬ is made. There are also given some results of com-

arison between the means directly computed from observations and those obtained from the istograms. *Subject Headings:* **1. Methods of computation 2. Histograms 3. Mean temperature omputation. I. Shepelevskiĭ, A. A.**—*Author's abstract.*

10L–738 551.501.5:551.509.325

Ugreninov, I. T., **Graficheskiĭ metod tumana (maloĭ zablagovremennosti).** [The graphic method of forecasting fog on short notice.] *Meteorologiia i Gidrologiia*, Leningrad, No. 12:44–45, Dec. **1958.** 1 fig. **DLC**—The author describes a simple graph by means of which it is possible to set up storm warnings on the start of a fog 1–3 hrs in advance. The graph is based on the principle of the formal extrapolation of the dew point and air temperature. The dew point and air temperature are plotted on the ordinate and time in hrs and min on the abscissa. An example of a forecast is presented and the adequacy of this technique is discussed. *Subject Headings:* **1. Fog forecasting methods 2. Graphic prediction models.**—*I.L.D.*

10L–739 551.501.5:551.55:629.13(02)

U. S. Air Weather Service, **Wind Factor Program: AWS Form 55: RCS: AWS-U20.** Its *AWS Regulation*, No. 55-22, June 30, **1955.** 9 p. **DWB**—Regulations to be used by all AWS units clearing USAF flights requiring wind factor information (POMAR flight log and AIREP flight log). The Wind Factor Program "is a system of computing, transmitting, collecting, and using average wind factors, both forecast and observed, over air routes." It is used in checking flight times, determining flight altitudes and selecting optimum flight paths; can be used as a forecast aid and in verifying wind forecasts and pressure charts. Codes and forms are appended. *Subject Headings:* **1. Wind factor program 2. Aviation meteorology 3. Flight plans 4. POMAR reports 5. Manuals.**—*M.R.*

10L–740 551.508.79:551.579.4

Urziceanu, Diana and Crăcium, Sever, **In legătură cu înregistrarea semnalelor emise de morişca hidrometrică.** [Recording of signals transmitted from a current meter.] *Meteorologia şi Hidrologia*, Bucharest, 1(1):46–49, Oct. **1956.** 3 figs. **DWB**—A simple and accurate current meter recorder is described and shown in a diagram. Interpretation of the records is explained. *Subject Headings:* **1. River gages 2. Current meters.**—*G.T.*

10L–741 551.501.5:518.3

Vasić, R. (*Belgrade*), **Primena i korist nomografije u meteorologiji.** [Use and convenience of nomographs in meteorology.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 3(1/2):27–33, Jan./June **1954.** 4 figs., 2 tables, eqs. **DWB**—A nomograph based on Babinet's formula for determining altitude from known temperature and pressure values is described and its use explained by an example of its application to data for Belgrade and nearby stations. *Subject Headings:* **1. Nomographs 2. Hypsometric formulas 3. Babinet's formula.**—*G.T.*

10L–742 551.501.5:551.571

Vemić, Milan, **Jedna prosta, grafička metoda za odrebivanje pritiska pare i relativne vlažnosti.** [A simple graphic method for determining vapor pressure and relative humidity.] *Yugoslavia. Hidrometeorološka Služba. Hidrometeorološki Glasnik*, 1(2):117–120, **1948.** 3 figs. In Serbian. **DWB**—Some practical instructions for the construction of a graph for absolute and relative humidity calculation on the basis of usual psychrometric formulas. *Subject Headings:* **1. Graphic presentation 2. Vapor pressure calculations 3. Humidity calculations.**—*N.T.Z.*

10L–743 551.501.5:551.582.3

Walter, H., **Wie kann man den Klimatypus anschaulich darstellen?** [How can climatic types be represented graphically?] *Die Umschau*, Frankfurt a.M., 57(24):751–753, Dec. **1957.** 21 figs., 5 refs. **DLC**—A climatic diagram representing the total picture of the climate of a region or locality is described. It consists of a graphic representation of the annual variation of the most important climatic elements, namely, the annual variation of temperature and precipitation, duration and intensity of humid and dry seasons, and the presence or absence of frost periods. The climatic diagram is constructed in the following manner: the months from Jan. to Dec. (Northern Hemisphere) are plotted on the abscissa and the temperature in 0°C, and the precipitation in mm are plotted on the ordinates, whereby the scale is chosen in such a manner that 10°C = 20 mm, when the precipitation curve is below the temperature curve a drought period is present when 10°C = 20 mm. For regions with summer rainfall a scale of 10°C = 30 mm is used. In very humid regions with monthly precipitation greater than 100 mm the scale of the amount above 100 mm is reduced to $\frac{1}{10}$ and the area is shown in black. Typical climatic diagrams for particular climatic regions are shown. They include the following climatic types: climatic types with zenith rain (i.e., tropical rainfall, since it takes place usually when the sun is at the zenith), arid climates, climates of northern temperate

zone with cyclonic precipitation predominantly in summer, and boreal continental climates. *Subject Heading:* **1. Climatic charts.**—*I.L.D.*

10L–744 551.501.5:551.51

Yamaoka, T., **A unified study of the adiabatic diagram.** *Papers in Meteorology and Geophysics* 2(3–4):285–295, Dec. **1951.** 10 figs., 3 refs., 32 eqs.—The author after making a systematic study of the adiabatic diagrams, discusses their advantages and disadvantages in a detailed way and proposes a new diagram, called the log θ, M-diagram, which is regarded as the simplest and most effective one. M =the geopotential height and θ the indicative temperature of the standard atmosphere. *Subject Heading:* **1. Adiabatics.**—*A.A.*

METHODS OF OBSERVATION AND COMPUTATION OF UPPER AIR (551.501.7

Aircraft Reconnaissance And Observation

10L–745 551.501.7:551.507.353

Baker, Wallace C., **Flying weather stations.** *Air Facts*, New York, 15(7):39–46, July **1952.** **DLC**—Activities of the 53rd Strategic Reconnaissance Squadron (the "Hurricane Hunters") are described. The squadron operates with a base in Bermuda. The report includes information on the squadron's equipment, on methods of observation, on routine flight routes, and on hurricane flights. Other squadrons of Air Weather Service are mentioned and their operation bases indicated. *Subject Headings:* **1. Airplane weather reconnaissance 2. Observation techniques.**—*G.T.*

10L–746 551.501.7:551.506.1:551.509.1

Cook Research Laboratories, Skokie, Ill., **Forms of records.** Contract AF 33(038)-23324 Weather Reconnaissance System Studies, Interim Report No. PR 17-2, Oct. 10, **1951.** 8 p. 8+figs. **DWB**—Representation of weather data, especially from reconnaissance planes should be both digital and graphic. The unitary form of notation developed under this project and presented here embraces both features. Examples are given. The system lends itself to direct automatic recording, distant transmission and recording, plotting on maps and summarization, with no conversions necessary provided the necessary equipment is developed. *Subject Headings:* **1. Unitary digital recording 2. Weather reconnaissance systems 3. Air-borne recording systems.**—*M.R.*

10L–747 551.501.7:551.509.31

†Cook Research Laboratories, Skokie, Ill., **Overall operational plan.** Contract AF 33(038)-23324, Interim Report, No. PR 17-4, May 5, **1952.** 88 p. 12 figs., 28 refs., 26 eqs. **DWB**—An extremely detailed analysis of all manner of instrumental, observational, recording, reporting and forecasting operations involved in aircraft weather reconnaissance. Some phases of the scheme are reported in previous numbers of this series. Elaborate models, conversion scales and nomograms, operational schemes and such visual presentations to show relationships between parameters and operations are appended. Not only aircraft observations are considered by land, ship, radiosonde, dropsonde, and radar observations, codes, analysis, etc. which would fall into any high speed mechanical integrating systems. *Subject Headings:* **1. Aircraft weather reconnaissance systems 2. Synoptic analysis systems.**—*M.R.*

10L–748 551.501.7:551.55:551.507.352

Cook Research Laboratories, Skokie, Ill., **Improvement in air speed measurements as a means of improving the accuracy of wind determination from aircraft.** Contract AF 33(038)-23324, Interim Progress Report PR 17-15, June 15, **1955.** Each section repaged. 23 figs., 14 refs., eqs. **DWB**—Whereas wind speed measurements from aircraft are accurate enough for navigation purposes, they are not accurate enough for forecasting and isotach analysis, as in determining cyclogenesis or cyclolysis. Three methods of wind determination from aircraft are considered: 1) fix to fix method, 2) single heading ground drift, and 3) multiple drift method where drift angle is measured on 2 or more headings. Winds are computed on an E-6-B computer or on a navigation chart. Errors in any of the 3 methods arise from errors in measurement of true air speed. Also improved height measurements are necessary. Doppler methods are explained along with other methods. A detailed analysis of sources of air speed error and methods of correction recommended, is presented in outline and in graphical form. *Subject Heading:* **1. Airplane wind estimation.**—*M.R.*

10L–749 551.501.7:551.507.352

Cook Research Laboratories, Skokie, Ill., **The observation of gradients.** Contract AF 33(038)-23324, Interim Report, No. PR 17-18, Feb. 2, **1955.** 14 p. 18 plates, 5 refs., eqs. **DWB**—Horizontal gradients of pressure, temperature, wind and derived parameters such as vorticity, D values,

etc. can be obtained from vertical (or almost vertical) soundings with balloons (radiosondes, etc.), or from horizontal soundings with balloons (constant level) or airplanes. The vertical soundings are very accurate as a rule, but gradients calculated therefrom can be in error due to systematic errors of one or more stations. Horizontal soundings give continuous records so gradients may be more accurate, though systematic errors would give erroneous absolute values. The greatest difficulty is in handling the data. Formulas are derived, in this report, for calculating horizontal gradients of such parameters from airplane reconnaissance reports. They are based on a new gradient operator ∇n and are worked out for 3 lines, 3 points, 4 points, 6 points, 2 intersecting points, etc. *Subject Headings:* **1. Aircraft weather reconnaissance observations 2. Horizontal gradient observations 3. Weather reconnaissance systems.**—*M.R.*

10L–750 551.501.7:551.507.352

Cook Research Laboratories, Skokie, Ill., **Atmospheric reconnaissance systems studies.** Contract AF 33(038)-23324, Final Progress Report, FPR 17-1, July 15, **1955.** 15 p. **DWB**—The advantages of binary, unitary decimal digits and scaled unitary for analog observational and recording systems are compared and the unitary decimal digital record system recommended for aerial reconnaissance systems. Application to radar altimetry, air speed measurements, hygrometer recording and improvement of these to make integrated recording more feasible are suggested. *Subject Headings:* **1. Air-borne recording systems 2. Aircraft weather reconnaissance systems 3. Unitary decimal digit recording.**—*M.R.*

10L–751 551.501.7:551.507.362.1

Michigan. Univ. Engineering Research Institute, **Atmospheric phenomena at high altitudes.** Contract DA-36-039-SC-15443, Project DA 3-99-07-22, Project Sc 172B, Progress Report, No. 8, Quarterly Report for Oct. 1–Dec. 31, **1953.** 9 p. 5 figs. (incl. photos of instruments), tables. **DWB**—Work included investigation of absorption in sampling bottles, development of a new bottle preparation technique, and the preparation of sampling aerobee Sc-34. *Subject Headings:* **1. Upper air sampling 2. Aerobee rockets.**—*M.R.*

10L–752 551.501.7:551.507.352

Rossing, Arthur T., **Aircraft reconnaissance as a means of obtaining observations in the lower stratosphere, with emphasis on future development.** (In: American Meteorological Society. District of Columbia Branch, **Proceedings of the Workshop on Stratospheric Analysis and Forecasting, Feb. 1–3, 1956.** pub. **1956.** p. 20–23. table.) **DWB**—All weather reconnaissance equipment consists of two groups: vertical sounding equipment and flight level equipment. The former is essentially the AN/AMT-3 dropsonde system which includes a radiosonde, a receptor AN/AMR-1 and the dispenser AN/AME-1. The accuracies obtained with the radiosonde are given and the operation of the system is described. The flight level equipment which includes the AN/AMQ-7 humidity-temperature indicator and the AN/AJH-1 recording system are described. Mention is made also of the cloud base and top indicator. A table with the parameters, source and resolution of the AN/AJH-1 weather data recording system is presented. The future developments in aircraft meteorological equipment are outlined. *Subject Headings:* **1. Aircraft weather reconnaissance 2. Dropsondes 3. AN/AJH-1 weather data recording system 4. Air-borne meteorological instruments.**—*I.L.D.*

10L–753 551.501.7:551.507.352

Rutherford, G. T. and Crowder, R. B. (*both, Central Office, Melbourne*), **Aircraft weather reconnaissance over waters south of Western Australia.** *Australian Meteorological Magazine*, Melbourne, No. 22:10–23, Sept. **1958.** fig., 2 tables, 3 refs. **DWB**—An evaluation is made of aircraft weather reports during reconnaissance operations over the 6-wk period of Operation 'Antler.' The use of the reports is discussed for analysis and prognosis of both M.S.L. and upper level charts. The assessment of the value of the reports is made by considering the analyses with and without the reconnaissance reports. It is considered that the contribution of the reconnaissance in about 50% of cases consisted in confirming the analysis made without the reconnaissance reports, i.e. based on historical development from previous charts. In the remaining cases, however, the reports resulted in significant alteration to the analysis. *Subject Headings:* **1. Aircraft weather reconnaissance 2. Aircraft weather reports.**—*Author's abstract.*

10L–754 551.501.7:37(02)

U. S. Air Weather Service, **Weather officer, reconnaissance.** *U. S. Air Weather Service, Training Guide*, No. 50-5, May **1951.** 42 p. figs., forms. **DWB**—Technical course intended to qualify a weather officer for reconnaissance work including aircraft observations, apobs, dropsondes, radar scope observations and calculation of altitude and drift. *Subject Headings:* **1. Weather reconnaissance courses 2. Dropsonde observations 3. Training manuals.**—*M.R.*

Balloons And Radiosondes

10L–755 551.501.7:551.508.822

Ackermann, Paul, **Korrektur der Formel zur Berechnung der Höhe aus aerologischen Aufstiegen und Temperaturgradient eines schweren Gases.** [Correction of a formula for the calculation of heights from aerological ascents and temperature gradients of a heavy gas.] *Meteorologische Rundschau*, Berlin, 11(4):120–122, July/Aug. **1958.** 5 refs., 7 eqs. German, French and English summaries p. 120. **DWB, DLC**—It is shown that the formula generally used in calculating the height of radiosondes is not exact because the attraction of the earth's gravity is not directed to the earth's center and does not act perpendicular to a plane. The resulting error in the determination of aerological ascents is relatively small up to a height of 30 km. But the calculation of the temperature gradient of a gas subjected to the earth's gravitational force changes considerably depending upon whether the gravitational force acts perpendicular to a plane, or whether as is the case of the earth's atmosphere, a centrifugal force acts in the direction of the center of the earth. The calculated mean temperature gradient in the troposphere is −6.3°C/km. The equation for correcting the altitude formula for determining the temperature gradient of a heavy gas in the case of a gravitational force perpendicular to a plane and in the case of centrifugal force are presented. *Subject Headings:* **1. Radiosonde height calculation errors.**—*Author's summary and I.L.D.*

10L–756 551.501.7:551.510.53

American Geophysical Union. Committee on the Upper Atmosphere, **Report of the Committee.** Harry Wexler, Chairman. *American Geophysical Union, Transactions*, 38(6):954–959, Dec. **1957.** Bibliog., p. 957–959. **DWB, DLC**—There has been an increase in the average ceiling of meteorological sounding balloons that has enabled further exploration of the stratosphere below 30 km, and the atmosphere above 30 km. The latter has been investigated mainly by rocket, acoustic and radio techniques. Areas of investigation have been those of winds, standard atmosphere, aurora, airglow, atmospheric density and composition, meteors, solar and cosmic radiations, and ionosphere. Studies of the stratosphere below 30 km cover the following areas: pressure and temperature patterns, prediction, ozone and water vapor observations as well as the stratospheric meridional circulation models. *Subject Headings:* **1. Sounding balloons 2. Stratospheric research 3. Atmospheric structure 4. Upper atmosphere research.**—*N.N.*

10L–757 551.501.7:551.508.822:551.507.321.4

Anderson, P. A.; Barker, C. L. et al., **The captive radiosonde and wired sonde techniques for detailed low-level meteorological soundings.** Washington (State) State College, Pullman. Dept. of Physics, Contract OEMsr-728, Report No. 3, Oct. 4, **1943.** 9 p. fig. **DWB** (M(051) W319we)—Two independent techniques for measuring atmospheric temperature and relative humidity as a function of altitude from ground level to 1000–2000 ft are described. The "captive radiosonde" utilizes standard U. S. Weather Bureau radiosonde equipment, modified only by replacing its pressure actuated switch by a light, clock driven commutating switch. Temperature and humidity are transmitted and recorded as in the free radiosonde. In the more generally useful wired sonde method, the electric temperature and humidity elements of the standard radiosonde are sent into the air at the end of a light cable, incorporated in the anchor line of a small balloon or kite. The currents established by a constant voltage are translated into temperature and relative humidity by calibration of the elements at known temperatures and humidities. Polarization of the elements is minimized by continuous commutation of the current at half-second intervals. The wired sonde equipment is simple, rugged and inexpensive. Its accuracy is comparable and its sensitivity and response speed superior to that of the large hygrothermograph. The technique does not require the use of towers, aircraft or other special facilities and appears to be well adapted to operational use under a wide range of field conditions. *Subject Headings:* **1. Low level sounding systems 2. Radiosonde observation techniques 3. Captive balloon radiosonde. I. Fitzsimmons, K. E. II. Stephenson, S. T.**—*Authors' abstract.*

10L–758 551.501.7:551.508.822

de Lisle, J. F., **Optimum spacing of the radiosonde network in New Zealand.** *New Zealand. Meteorological Service, Technical Note*, No. 110, March 25, **1954.** 9 p. 7 figs., 6 refs. **DWB**—A statistical method developed by Malet for finding the optimum spacing of radiosondes has been applied to upper air data from Raoul, Auckland, Hokitika and Invercargill for the winter months of 1953. It is found that with the present accuracy of the sondes used there would be no advantage in more than three radiosonde stations in New Zealand. The physical basis of the method used is briefly discussed. *Subject Headings:* **1. Radiosonde networks 2. New Zealand.**—*Author's abstract.*

10L–759 551.501.771:551.571.7

Dvorcsák, István, **A nedvesség advektív változásának meghatározásáról.** [Determination of advective changes in humidity.] *Időjárás*, Budapest, 60(3):181–182, May/June **1956.** fig., eqs.

DLC—Specific humidity may be determined for any height by multiplying the surface humidity by a factor c variable with height. Values of c were drawn for Berlin by SÜRING and for Budapest by BÉLL. The author discusses the influence of season, time of day, inversions, air mass and variations of the wind field upon the accuracy of humidity aloft as determined from surface humidity. *Subject Heading:* **1. Upper air humidity calculations.**—*G.T.*

10L–760 551.501.75:551.557

Gifford, Frank, Jr. (*U. S. Weather Bureau*), **An alignment chart for double theodolite computations.** *Monthly Weather Review*, 80(9):148–150, Sept. **1952.** fig., 4 eqs. **DWB**—A page size sample of a double theodolite alignment scale, which can be enlarged on photographic film and pasted on the back of the usual upper wind plotting board to make the preliminary calculations from 2 theodolite balloon runs, enables one observer to keep up with computations on such runs, thus making results immediately available. The circular three-variable alignment chart replaces the old slide rule or desk calculator method, and is said to be fast, simple and economical. *Subject Headings:* **1. Double theodolite alignment scales 2. Upper air wind computation.**—*M.R.*

10L–761 551.501.7:551.507.3(26)

Mastenbrook, H. J., **The transosonde: a new system of meteorological data collection.** (In: American Meteorological Society, District of Columbia Branch, **Proceedings of the Workshop on Stratospheric Analysis and Forecasting, Feb. 1–3, 1956.** pub. **1956.** p. 24–36. 7 figs., 7 refs., 3 eqs.) **DWB**—The development and principles of the transoceanic sounding systems or transosonde as a means of collecting meteorological data and the present status of data coverage in the Pacific are described briefly. Results are given of the field program of 1953 "which served to establish the technical feasibility of the system and provided a large quantity of trajectory data for meteorological evaluation." The instrumentation, tracking and trajectories of the 1953 flights are described. The evaluation of tracking capability, positioning capability and meteorological significance of the transosonde data are discussed, the latter with particular reference to the analysis of forms of transosonde data and their utilization and the representativeness of height contour, as derived from trajectory data by NEIBURGER and ANGELL (*Journal of Met.* 13(2), April 1956). Flights during Jan. and Feb. 1956 are summarized briefly. Maps showing status of data coverage in the Pacific and transosonde flights launched from Minneapolis in 1953, transosonde flights launched from Oppama, Japan in 1956 and graphs showing bearing analysis of 1953 flights, for probability with assumed bearing range of 3000 mi etc. are presented. *Subject Headings:* **1. Transosondes 2. Upper air wind observations 3. Transosonde trajectories 4. Pacific Ocean.**—*I.L.D.*

10L–762 551.501.7:551.507.321.2

Matsuhashi, S. and others, **On the "Pibal-Lamp" observation.** *Journal of Meteorological Research*, Tokyo, 4(11):879–895, Feb. **1953.** 14 figs., 7 tables, 8 refs. In Japanese; English summary p. 55.—Double theodolite observations of pilot balloons carrying a lamp were made at Tateno to check single theodolite observations. The formula $V=133L^{\frac{1}{2}}/(L+W)^{\frac{1}{2}}$ holds up to 2–4 km but systematic errors are found above 4 km. Variations of rate of ascent with height give maximum errors of $\pm 20\%$ in wind velocity, and a general theoretical formula could not be found. There is no correlation between rate of ascent and wind velocity up to 30 m/s. *Subject Headings:* **1. Pilot balloon observations 2. Double theodolite observations.**—*C.E.P.B.*

10L–763 551.501.7:551.508.822(68)

Nagel, J. F., **Unusual radiosonde sounding at Pretoria on September 14, 1957.** *South Africa. Weather Bureau, Notos*, 6(3/4):120–122, **1957.** 2 figs., 3 refs. **DWB**—A radiosonde released at 0730 South African Standard Time (S.A.S.T.) at Pretoria on Sept. 14, 1957, first ascended to 4000 m (637 mb) into supercooled nimbostratus, then descended to 2300 m (780 mb). From this level it ascended again and eventually reached 46 mb. The descent is ascribed to a deposit of water and ice which formed on the balloon and radar target in the nimbostratus. During the second ascent the air was considerably warmer and drier than during the first ascent and this rapid warming can be explained by advection of warm air rather than by subsidence. *Subject Headings:* **1. Radiosonde ascent height increase 2. Pretoria, South Africa.**—*Author's abstract.*

10L–764 551.501.7:621.642:546.11:632.18:551.594.11

Nakajima, M.; Akita, I. and Yamada, I. (*all, Aerological Obs., Tateno*), **On the inflammation of hydrogen gas bomb.** *Tateno, Japan. Aerological Observatory, Journal*, 6(2):87–92, Feb. **1958.** 2 figs. In Japanese; English summary p. 87. **DLC**—A little after noon on July 5, 1957, a hydrogen gas bomb stored in a warehouse of the Aerological Observatory began to shoot out flames suddenly, and about 200 other gas bombs suffered from the spreading flames one after the other within only 7 min or less. The cause of the fire could not easily be detected because there was no one near there at that time, and there may be many factors which caused the event. As thunder occurred about

4 hrs later, someone was of the opinion that the weather conditions might have been a cause of the fire. The authors intend to investigate the conditions of the flaming of hydrogen gas leaking or gushing from gas bombs, which is a steel cylinder 175 cm in length and 20 cm in diameter, having a cock (faucet) on one end. In this paper, (A) an experience is described and some considerations on another fire are mentioned and (B) some results of preliminary experiments on the static electricity of gas bombs are given as follows: (1) On a winter day, one of the authors experienced a small flaming of hydrogen gas when he began to turn slowly a bomb cock, which was laid down directly on the ground, and did not flame when the gas gushed out quickly. He tried other bombs chosen at random, obtaining the same result. It may then be concluded that (i) the grounding of the gas bomb cannot protect the flaming of hydrogen gas, or in other words, grounding is merely a necessary condition but not sufficient to protect the flaming, and (ii) static electricity plays an important role in lighting the hydrogen gas. (2) (i) Electric potential induced on the gas bomb was measured to the order of 100 kv. when the gas was gushed out by opening the cock completely. (ii) Electric potential was measured to almost zero when the bomb was grounded by a resistor of 1 $M\Omega$, in the same condition as (i). (iii) The intensity of electrification may be affected by the velocity of the gas flow and the conditions of the nozzle. *Subject Headings:* **1. Static electricity of gas bombs 2. Inflammability of gas bombs 3. Lightning damage to gas bombs.**—*Authors' summary.*

10L–765 551.501.7:551.507.321

Poncelet, L., **Sur la vitesse ascensionnelle des ballons en caoutchouc.** [On the ascension rate of rubber balloons.] *Belgium. Institut Royal Météorologique, Mémoires*, Vol. 13, **1940.** 147 p. 36 figs., 14 tables, 57 refs., eqs. Review by J. Van Mieghem in *Ciel et Terre*, 57(11):2, **1941.** Review by L. Auberger in *La Météorologie*, Ser. 3, p. 86–87, **1941.** Review in *Zeitschrift für Angewandte Meteorologie*, 58:197–200, **1941.** Also: Poncelet, L., **Remarques complémentaires sur la vitesse ascensionnelle des ballons-sondes.** [Supplementary note on the ascension rate of sounding balloons.] Reprint from *Mémoires*, v. 48, **1951.** 7 p. 2 figs., 6 refs., eqs. **DWB**—The aerodynamic behavior of balloons in a finite and a free atmosphere is discussed in detail (including comparison with fixed spherical objects in a wind tunnel) theoretically and with the help of experimental data. Velocity variations of balloons as a function of altitude are analyzed in connection with the various atmospheric forces involved. By attributing some of the variations of ascension rate to the aerodynamic peculiarities of balloons, a relation is found between ascension rate and vertical thermal gradient, allowing for turbulence, where necessary. *Subject Headings:* **1. Balloon ascension rates. I. Van Mieghem, J. II. Auberger, L.**—*G.T.*

10L–766 551.501.75:551.555.7

[An appeal for the return of lost radiosondes.] *Science*, Wash., D. C., 122(3174):827, Oct. 28, **1955. DLC**—U. S. Air Weather Service, and U. S. Weather Bureau have called for return of lost radiosondes by finders. Sets cost about $35 each, and cost of rehabilitating a set is only $6 or $7. About 8% of all AWS radiosondes released in the first 3 months of 1955 were recovered, but at least 25% might be found and returned. *Subject Heading:* **1. Radiosonde recovery.**—*M.R.*

10L–767 551.501.7:551.508.822

Sumi, T. (*Aerological Obs. Tateno*), **On the ascensional rates of balloons.** *Tateno, Japan. Aerological Observatory, Journal*, 6(2):81–86, Feb. **1958.** 2 figs., 2 tables, 3 refs. In Japanese; English summary p. 81. **DLC**—From data of the radiosonde made at Tateno during Nov. 1953–Oct. 1954, the author computed the drag coefficient C and the corresponding Reynolds number R by means of the following equations:

$$C = \frac{2g}{\pi}\left(\frac{4\pi\alpha}{3}\right)^{\frac{1}{3}} \cdot \rho^{-\frac{1}{3}} \cdot v^{-2} \cdot L \cdot Q^{-\frac{1}{3}},$$

$$R = 2\left(\frac{3}{4\pi\alpha}\right)^{\frac{1}{3}} \cdot \rho^{\frac{1}{3}} \cdot \mu^{-1} \cdot v \cdot Q^{\frac{1}{3}},$$

here ρ = density of the surrounding air; μ = viscosity of air; $\alpha = 1 - 0/\rho$; ρ = density of inner gas; v = ascensional rate; L = free lift; Q = total lift; and g = acceleration of the gravity. The results are plotted, and the drag curve thus obtained in comparison with that by M. Erikson or I. Imai, are considered with the effects of the difference between the temperature and pressure of the inner gas and that of the surrounding air. Moreover, the monthly mean values of the deviations of the ascensional rate from that expected by annual mean drag curve are computed. Supposing that the deviations of ascensional rate are attributed to the atmospheric vertical motion, it is seen that they coincide qualitatively with a meteorological common sense to some degree. *Subject Headings:* **1. Balloon ascension rates 2. Radiosonde data.**—*Author's summary.*

Methods Of Charting And Sounding

10L–768 551.501.75:551.543

*Hughes, L. A., Jordan, E. S. and Renard, R. J., **On the computation of upper-level winds from constant pressure charts.** Chicago. Univ. Dept. of Meteorology, Contract N6ori-02036, [unnumbered report], Aug. **1953.** 10 p. 7 figs., table, 11 refs., eqs. **DWB**—Nomograms were constructed for the computation of the gradient wind considering the curvature of streamlines, for which purpose Lambert's conic projection should be used. Results are tested for 468 observed winds, showing the error distribution separately for cyclonic, anticyclonic and no-curvature cases. The computational technique is developed especially for the jet stream region (300–200 mb). More data are required for navigation purposes, since errors of 50% and more can originate in the analysis of contour height gradients and due to nongradient components. *Subject Headings:* **1. Upper air wind computation 2. Constant pressure charts.**—*A.A.*

10L–769 551.501.7:551.587(02)

Jehn, Kenneth H. (*N. Y. Univ. Dept. of Met.*), **Procedure for plotting and analysis of vertical atmospheric cross sections, Pt. 1. Analytical cross sections. Pt. 2. Pictorial cross sections.** Jan. 20, **1944.** 25 p. figs., refs. throughout Pt. 1, and on p. 25. Mimeo. **DWB**—A concise manual with many diagrams and schematic charts, intended for training in aerological analysis by means of cross sections based on radiosonde and cloud or pilot observations. Pictorial cross sections such as are used in flight planning, are treated in detail. Effect of topography as well as fronts, air masses, etc. is emphasized. *Subject Headings:* **1. Aerological analysis 2. Aerological cross sections 3. Aerological analysis manuals. I. New York. University. Dept. of Meteorology.**—*M.R.*

10L–770 551.501.75:551.55

Maksić, Branko, **Prilog teoriji i primjeni gradijentskog vjetra.** [A contribution to the theory and application of the gradient wind.] *Yugoslavia. Hidrometeorološka Služba, Rasprave i Studie,* No. 3, **1951.** 20 p. 23 figs. (4 fold. in pocket), foot-refs. In Croatian; English summary p. 19–20.—With the assumption that cyclonic or anticyclonic motion is circular and frictionless, a theory of gradient wind motion is developed, and from this theory and its application to the special cases found in ordinary synoptic analysis (variations in radius of curvature of isobars and in latitude) gradient wind tables and elaborate scales for everyday use are constructed, and their use described and illustrated. Large copies of the 6 scales or nomograms are appended. *Subject Headings:* **1. Gradient wind scales 2. Nomograms 3. Gradient wind theory 4. Croatian language.**—*M.R.*

10L–771 551.501.7:551.515:551.513.2:551.557.5

Means, Lynn Lester, **Computation of speed of sinusoidal waves on the "jet stream" at 500 MBS. by Petterssen's method** [1952]. 1 p. 3 figs. (lacks figs. 1 and 3), ref. **DWB** (M57.2 M483c)—A complex nomogram is provided and described, for use in rapidly calculating the speed of a westerly wave where the gradient wind at core along trough line, the wave length, latitude, and the half-width of the westerly current at the trough or ridge line are taken from the synoptic chart. *Subject Headings:* **1. Westerly wave speed calculations 2. Jet stream analysis 3. Nomograms. I. Petterssen, Sverre.**—*M.R.*

10L–772 551.501.7:551.505.822

Miller, Paul H. (*Atmospheric Studies Branch, Instrument Operations Div. Test Dept.*), **A revised system for computing upper air data using modified adiabatic charts.** *U. S. Naval Ordnance Test Station, NOTS TP* 2143; *NAVORD Report* 6437, Sept. 30, **1958.** 20 p. 7 figs., tables. **DWB**—This report explains the use of a set of four adiabatic charts developed at the Naval Ordnance Test Station as a modification of standard Weather Bureau procedures for computing rawinsonde data. The charts are adaptable to any locale within a temperate latitude, and present data in increments of feet above the mean sea level or above the surface rather than in the standard height increments of meters. The use of these charts greatly reduces the number and degree of potential errors that often result from conversion of altitude from m to ft, either with significant or mandatory rawinsonde levels. *Subject Headings:* **1. Rawinsonde data 2. Adiabatic charts.**—*Author's abstract.*

10L–773 551.501.7:551.509.312

Moreland, William B., **Extrapolation scattergrams for the 50—mb constant-pressure surface.** Wash., D. C., U. S. Weather Bureau, May 1, **1956.** 59 p. almost entirely graphs, ref. photostat of typescript. **DWB**—A series of 83 isohypse-isotherm scattergram charts are provided for extrapolating from 100 to 50 mb when drawing constant pressure charts for high levels in areas where little or no data are available. Each chart shows the height or temperature for 50 mb for any given height and temperature at 100 mb for any given height and temperature at 100 mb for a given month of the year and a given latitude range (10°–20°, 20°–30°, 30°–40°, 40°–50°, 50°–60°, 60°–70°, and

70°–90°N). The charts were made from all Weather Bureau, Air Force and Navy radiosonde ascents during 1952 and 1953, with added data from NW European stations and were used for months of analyzed charts (Jan.–May and July–Oct., 1953). Where the temperature scatter is great the isotherms are not very reliable, but the height scatter permits fairly reliable isohypses. *Subject Headings:* **1. 50 mb chart analysis 2. Extrapolation scattergrams 3. Constant pressure charts**—*M.R.*

10L–774 551.501.7:551.511

Panofsky, H. A. (*Pennsylvania State Univ.*) and Wolff, P. (*Lcdr. USN*), **Spectrum and cross spectrum analysis of hemispheric westerly index.** *Tellus*, Stockholm, 9(2):195–200, May **1957**. 3 figs., 2 tables, 4 refs., eq. **DLC**—Also issued with title: **Cross spectrum analysis of hemispheric 500 mb zonal indices at latitudes 25°N, 40°N and 60°N.** U. S. Bureau of Aeronautics (Navy) Project AROWA (TED-UNL-MA-501.27); Research Report on Task 27 [Unnumbered], March **1956.** 18 p. 3 figs., 2 tables, 4 refs. **DWB** (M52 P195c)—The following tentative conclusions are drawn from results of cross spectrum analysis applied to the hemispheric 500 mb zonal index at latitudes of 25°N, 40°N, and 60°N. 1) Most of the variations of the indices at 40°N and 60°N are produced by oscillations with periods of the order of 25 days. This result is obtained from two independent samples of data, each at least $2\frac{1}{2}$ yrs in length. At latitude 25°N, longer periods seem to be predominant. High frequency fluctuations with periods of the order of five days may also be important, but have been filtered out by the analysis. 2) The indices at latitudes 60°N and 40°N are correlated negatively. Most of this correlation is again contributed by oscillations with a period of the order of 25 days. The correlation between latitudes 25°N and 40°N is also negative, but so small as to be hardly significant. Again, both sets of observations agree fairly well in furnishing these results. 3) There is an indication of a slight lag of the long period variation of index at latitude 40°N behind that at 60°N. *Subject Heading:* **1. Zonal index.**—*Authors' abstract.*

10L–775 551.542.1:551.501.75:551.557

Paracchini, Salvatore, **"Compasso" per la determinazione pratica del vento geostrofico e per la ricerca delle distanze fra isobare o isoipse nelle normali carte del tempo al suolo e in quota.** [A "compass" for practical determination of the geostrophic wind or the distance between isobars or isohypses on ordinary surface and upper air charts.] *Rivista di Meteorologia Aeronautica*, Rome, 15(3/4):38–40, July/Dec. **1955.** 2 figs. French, English and German summaries p. 38. **DWB, DLC**—The device described and illustrated in this paper consists of a metallic sector with a geostrophic wind scale, and a transparent ruler with a latitudinal scale, the two being axially attached to each other at their ends. The use of this aid in synoptic chart analysis is briefly explained (determination of geostrophic wind speed at a given point, from the distance between two isobars, and vice versa). *Subject Heading:* **1. Geostrophic wind scales.**—*G.T.*

10L–776 551.501.7:551.507.3211

Phebco, Inc., Baltimore, Md., **Multiple object tracking system.** Contract AF 19(604)-1051, Final Report, May 21, **1954.** 42 p. 22 figs., table, eqs.—In March 1951, the Air Force Cambridge Research Center initiated a crash program to develop equipment for measuring the positions of 32 objects. Such equipment was necessary in order to measure the positions of a large number of pressure sensing devices. No economical means for accomplishing this multiple position measurement were available at that time. The equipment resulting from this crash program is called the Multiple Object Tracking System (MOTS) and this system is described in detail herein. The equipment produced usable position data for determining pressure patterns during tests in Nov. of 1951 and again during May and June of 1952. Such rapid development of the MOTS was possible because of its simplicity. The report which follows contains a review of the existing MOTS; a list of recommended improvements; a detailed description of a system incorporating the improvements recommended; a discussion of the geometry involved; a discussion of several aids to data processing and a brief description of a possible long range tracking system. *Subject Headings:* **1. Tracking systems 2. Balloon tracking.**—*Author's abstract.*

10L–777 551.501.7:551.521.31:551.507.321.2

Quirk, A. L., [**Insolation of the atmosphere**]. Rhode Island Univ. Upper Air Research Lab. Contract AF 19(122)-249, Final Report, June **1955.** 7 p. table, 4 refs.—Two approaches to the problem of measuring the intensity of solar radiation in the upper atmosphere were used. The first involved the use of instruments in rockets, and the second in plastic balloons. The rocket phase of the program was unsuccessful. The balloon equipment used Weather Bureau Global Pyrheliometers, with minor modifications, as the radiation detectors. Three successful flights on May 12 and 20, 1954 and Sept. 9, 1954 gave much data. Mean value of the data for the three flights is $2.008 \pm 1.5\%$ calories per sq cm per min on the Pyrheliometric Scale of 1913, or 1.96 calories per sq cm per min

the corrected scale of 1934. *Subject Headings:* **1. Solar radiation measurement by balloons olar radiation measurements 3. Solar radiation measuring equipment.**—*A.A.*

10L–778 551.501.7/8:551.557

Rapp, R. Robert; Engelman, Arthur; and Telegadas, Kosta, **Variability of upper winds.** New k Univ. College of Engineering. Research Div., Contract DA 36-039 sc-72, Progress Report -05, Sept. 15, **1951.** 26 p. 8 figs., tables, 3 refs., eqs. **DLC**—A mathematical analysis of errors adial and tangential components of the wind as a function of height, azimuth and elevation angle he balloon; and variance with time for radio and radar wind measurements. Small instrumental ors are magnified when the balloon is at a high altitude and subject to strong winds when radio hods are used, but with radar methods the instrumental errors are larger but the variant not reat. Thus if instrumental errors can be reduced for radar equipment, the final results would be e accurate during high winds. *Subject Headings:* **1. Radar wind measurement 2. Radio wind asurement 3. Upper air wind observation accuracy.**—*M.R.*

10L–779 551.501.75:551.557

Sheveleva, V. S., **Opredelenie skorosti vetra na vysote po nazemnym dannym.** [Determination wind aloft velocity on the basis of ground data.] *U.S.S.R. Glavnoe Upravlenie Gidrometeoro-cheskoĭ Sluzhby, Trudy Nauchno-issledovatel'skikh Uchrezhdeniĭ, Ser. 1, Meteorologiia*, No. 25:87–**1947.** 7 figs., 2 tables, 3 refs., eqs. **DLC**—Results of an investigation of wind speeds at altitudes to 1000 m (observation made at every 50 m height) at various hours of the day by the method of and two pilot balloons, simultaneous observations of wind velocity near the ground air layer , 2 and 5 m heights (Fuess anemometers) and air temperature readings at 5 and 150 cm above the und with aid of a small Assmann psychrometer carried out in 1942 by an expedition of the Central ophysical Observatory in the steppes of southern Kazakhstan are presented. They show: 1) the stence of a direct dependence between wind speed in the layer of mechanical intermixing and wind eds at ground level under different conditions of atmospheric stability; 2) using this dependence ecomes possible to determine the wind speed at altitudes on the basis of the speed of wind and of nperature gradients at 2 m level; 3) the upper boundary line of the layer of mechanical intermixing etween 250 and 500 m for inversion, and between 500 and 1000 m for adiabatic and superadiabatic dients; 4) the applicability of the logarithmic law of wind structure near the ground for the whole er of mechanical intermixing. Finally, Selton's supposition that the magnitude of roughness is a iable value has been confirmed. *Subject Headings:* **1. Winds aloft velocity 2. Winds aloft asurement.**—*A.M.P.*

10L–780 551.501.7:551.509.318:551.513(4)

§Tomashenko, Roman, **Nekotorye osobennosti indeksa zonal'noĭ tsirkuliatsii v Evrope.** [Some aracteristics of the zonal index in Europe.] *Acta Geophysica Polonica*, Warsaw, 5(4):277–282, **57.** 5 figs., 4 refs. Polish summary p. 282. **DWB, DLC**—The author discusses the relationship ween characteristic synoptic situations (employed in Poland) termed "circulation types" and the relation index (calculated for 40°–60°N lat. and 40–60°E long.). In addition to the five principal culation types there are six more during the winter months (Dec., Jan. and Feb.); a total of eleven. the basis of 630 days for the winter months of 1948/49–1954/55 the circulation index for sea level s examined. The curve of distribution of the circulation index (number of indices for individual lues along the ordinate and value of circulation index in m/sec along the abscissa) does not cor-pond entirely to a Gaussian curve but shows 5 maxima. In the case of western and southwestern culation each corresponds to one of the maxima and each constitutes a Gaussian curve. *Subject adings:* **1. Circulation types 2. Zonal index 3. Europe.**—*I.L.D.*

10L–781 551.501.75:551.557.2:551.509.31

U. S. Air Weather Service, **The computation of air trajectories.** *U. S. Air Weather Service, chnical Report* 105-62, June **1950.** 30 p. 8 figs., refs., numerous eqs. Mimeo. **DWB**—A report epared by ARTHUR F. GUSTAFSON of Hq. Air Weather Service, Washington, D. C., setting forth e theory and procedures to be followed by analysts and forecasters in computing air trajectories -dimensional, thermodynamic, isentropic or other types). The appendix contains discussion of the adient wind approximations, a nomogram for obtaining isentropic streamlines from contrast essure contours and isotherms, and a discussion of errors in computation of the Montgomery nction. *Subject Headings:* **1. Air trajectory computation 2. Isentropic analysis 3. Synoptic alysis. I. Gustafson, Arthur F.**—*M.R.*

10L–782 551.501.75:551.508.57

U. S. Air Weather Service, **Wind plotting set A-1.** Its *Air Weather Service Manual* 105–45, ig. 1, **1954.** 23 p. forms. **DWB**—Instructions for plotting balloon trajectories during rawin-nde flights to obtain wind speed and direction, are given in detail. The plotting equipment, its

use and care, and the use of auxiliary plotting brands are also set forth. Corrections for curva of the earth are illustrated by examples. *Subject Headings:* **1. Rawinsonde plotting equip 2. Upper air wind plotting manuals 3. Manuals.**—*M.R.*

10L–783 551.501.7:551.508.823:551.507.321.4:551.51

U. S. National Bureau of Standards. **Improved meteorological soundings.** Its *Technical B Bulletin*, 37(6):81–82, June **1953.** photos, refs. **DWB**—A brief summary of a paper publishe P. D. LOWELL and others in *U. S. Natl. Bur. of Standards, J. Research*, 50, 7 (Jan. **1953**), descri the wiresonde system developed before 1947 to obtain low level meteorological data for studi tropospheric refraction of radio waves. The NBS electromechanical altimeter is an essential of the system. In the humidity circuit, 60 cy ac is used instead of usual dc. This prevents usual polarization and deterioration of hygrometer element. Also, the ventilation of the humi and temperature elements and switching are by a gravity system which runs the blower and elimin the weight of the conventional battery motor. *Subject Headings:* **1. Wiresondes 2. Troposph radio wave propagation research.**—*M.R.*

10L–784 551.501.7:551

Wolff, Paul M. and Haggard, William H., **Use of the pastagram in pressure-height computati** (In: U. S. Navy. Fleet Weather Central, **Some recent developments in synoptic meteorol** Aug. **1952.** Section 4, 14+p. 4 plates, 4 tables, 2 refs., eqs. **DWB**—Two methods of extrapola to obtain upper air charts from the hydrostatic equation, when insufficient radiosonde or balloon data is available, are presented, together with all the necessary tables and nomograms making the computations. The first method is based on use of mean temperature of a layer the second is the "Lapse rate method." Extrapolation may be from the surface to 700 or 500 or from 600–500, 500–300, or 300–200 mb levels of data for the lower levels are available. *Su Headings:* **1. Upper air chart analysis 2. Extrapolation of aerological data 3. Constant level ch 4. Nomograms.**—*M.R.*

METHODS OF OBSERVATION AND COMPUTATION OF RADIATION (551.501.721)

10L–785 551.501.721:551.521.1:551.52

Busse, W. (*St. Blasien*), **Eine Methode fur spektrale UV-Messungen der direkten Sonn strahlung mittels UV-Selenzelle und Schottfiltern.** [A method for spectral UV-measuremen direct solar radiation by means of UV-Selenium cells and Schott filters.] *Meteorologische Rundsch* Berlin, 11(3):90–91, May/June **1958.** fig., 2 tables, ref., eqs. **DWB, DLC**—In the formula for current of a selenium ultraviolet cell illuminated by a filter combination penetrable by wave leng λ_1 to λ_2 namely $I = \int_{\lambda_1}^{\lambda_2} S_\lambda d_\lambda e_\lambda d\lambda$, S_λ the radiation intensity cannot be computed (d_λ = filter pe trability and e_λ = cell sensitivity). The formula $S_\lambda = \frac{q_\lambda (I - I')}{(d_\lambda - d'_\lambda) e_\lambda}$ for relating I and S_λ and quotient q_λ is determined by graphs for various air masses M 1.0, 1.5, 2.0 and 2.5 and for elevati above sea level 0 and 1789 m from measurements of PETI and ABBOT. The possibility of obtain the magnitude q_λ for any air mass is investigated. Filter combinations with substantially differ vertices of the $S_\lambda d_\lambda \epsilon_\lambda$ curve are found in the surroundings of which q_λ, with slight dependence u air masses can be determined graphically. It is shown that with seven rapid successive measu ments with the various filter combinations (UG 5+WG 6, UG 1+WG 4, UG 5+WG 4, etc.) it is poss to measure the intensity of the direct solar radiation in the absolute energy amount of 315 to 400 for every air mass and any elevation above sea level with considerable precision. *Subject Headi* **1. Solar radiation measurement techniques 2. Ultraviolet filters.**—*I.L.D.*

10L–786 551.501.721:551.510

*Gusarov, I. I. and Liapidevskiĭ, V. K., **Metodika izmereniia estestvennoĭ radioaktivn vozdukha po produktam raspada radona.** [Method of determining the natural radioactivity of from the products of radon disintegration.] *Gigiena i Sanitariia*, Moscow, 23(10):10–16, Oct. 19 fig., 3 tables, 6 refs. **DLC**—Radioactive aerosol was collected by aspirating samples of air thro a feeler fastened to a Seitz filter holder. The activity of the filter was measured from the α-radiat by means of a scintillating attachment to the B (R-349-2) installation and a diffusion chamber wh has a rectangular shape. The characteristic of the diffusion chamber and its recording capac the procedure for measuring a series of filters of Soviet manufacture and the properties of th filters are described. It is shown that the distribution of active substance in the body of the fi and the penetration coefficient of active aerosol through the filter depend upon the properties

lter, rate and time of filtering and dust content of the atmosphere. Neither atmospheric temure nor humidity within the limits of meteorological fluctuations influences the effectiveness of tion. The method of measuring the natural radioactivity of the atmosphere from the disration of radon involved the filtration of air through a given filter (2.9 cm in diameter) at a rate –75 lit/min. Every 3 min after the completion of filtration a disintegration curve was photohed. From the activity at the points at various time intervals the number of radioactive atoms , RaB and RaC (x,y,z) in the volume of air was determined and the activity of these atoms in s given by the equations:

$$Q_1 = \frac{x \cdot \lambda_1 \cdot p \cdot K \cdot 10^{-12}}{v.w.(2.22)}; \qquad Q_2 = \frac{y \cdot \lambda_2 \cdot p \cdot K \cdot 10^{-12}}{v.w.(2.22)}; \qquad Q_3 = \frac{z \cdot \lambda_3 \cdot p \cdot K \cdot 10^{-12}}{v.w.(2.22)}$$

e Q_1, Q_2, and Q_3 = activity of RaA, RaB and RaC; λ_1, λ_2 and λ_3 = density ratio constants of RaA, and RaC in min^{-1}; v = filtration rate in lit/min; w = correction for effective recording of α-icles in angle 2π. The results of computations are presented in tables. *Subject Headings:* **adioactivity in the atmosphere measurement techniques 2. Radon content of atmosphere.** *I.L.D.*

10L–787 551.501.721:551.521.32 551.508.27:551.524:551.5 **8.46**

Hamilton, R. A., **Measurements of radiation inside a Stevenson screen above a snow surface.** *orological Magazine*, London, 87(1035):272–273, Sept. **1958.** ref. **DWB, DLC**—On the basis adings of dry level thermometers in a Stevenson screen in a station on the Greenland ice sheet the or stresses the need for designing screens for use over snow surfaces to exclude diffusively cted solar radiation. Readings with a Weston exposure meter, mounted in the Stevenson screen, e period July 19 to Aug. 2, 1953, when the sun's elevation was 30°, varied from 130 units for y clear or with a small amount of cloud cover to about 30 for an overcast sky. When the sun approximately east or west at an altitude of about 19°, readings varied from 50 for a clear sky 0 for an overcast sky. *Subject Headings:* **1. Temperature measurement over snow surfaces adiation effects on temperature measurement 3. Radiation measurement inside Stevenson ens 4. Greenland.**—*I.L.D.*

10L–788 551.501.721:551.521.17

Kachan, A. A., **Novyi chuvstvitel'nyi indikator ul'trafioletovogo izlucheniia.** [New, sensitive cator of ultraviolet radiation.] *Gigiena i Sanitariia*, Moscow, 22(1):69, Jan. **1957. DLC**—The or describes a method for using the extremely sensitive reactions involving the formation of hyl blue from its colorless base when exposed to ultraviolet radiation as an indicator of ultraet radiation. This reaction occurs over the entire range of physiological activity of solar radiation)–400 mμ). A solution of the leucoform of methyl blue to which $SnCl_2$ is added, which restores leucoform of the methyl blue after the reaction with ultraviolet radiation, is placed in an ampule. structure of the latter, and its use are described with the aid of a diagram. *Subject Heading:* **ltraviolet radiation measurement techniques.**—*I.L.D.*

10L–789 551.501.721 551.521:627.81

Kirillova, T. V., **O metodakh rascheta radiatsionnogo balansa.** [Methods of calculating ation balance.] *Leningrad. Glavnaia Geofizicheskaia Observatoriia, Trudy*, 59(121):9–15, **1956.** gs., 3 tables, 2 refs., 8 eqs. **DLC, DWB**—The author examines existing methods of computing radiational balance of reservoirs on the basis of available meteorological data. The annual iation of total radiational balance for a cloud-free sky (lat. 70° and lat. 40°) was computed by the iation balance equations of T. Berliand (*Trudy G. G. O.* 48(110), **1954**) and A. P. Braslavski 7.3–15, Mar. 1956, *MAB*). Also the monthly values of radiation absorption and of total radiaa computed by means of these formulas are compared. The method of A. P. Braslavski was nd to be inadequate and to lead to large errors both in calculating incoming as well as the outg part of the radiation balance. The method of M. I. Budyko and T. G. Berliand is designed climatological computations and can be used to calculate radiation balance and its components short intervals of time. In computing radiation balance for individual months it is necessary ake into account the effect of cloudiness upon effective radiation for individual layers, the effect albedo upon the total radiation and to investigate the problem of introducing corrections for nospheric stratification, which is especially important in computing the radiation balance of a er surface. *Subject Headings:* **1. Radiation balance calculations 2. Radiation balance of ervoirs.**—*I.L.D.*

10L–790 551.501.721:551.521.1

Kondrat'ev, K. Ia. and Volkova, G. P., **Sutochnyĭ khod i vozmozhnye summy summarnoĭ iatsii.** [Diurnal variation and possible sums of total radiation.] *Meteorologiia i Gidrologiia*,

Leningrad, No. 7:30–32, July **1958.** 2 tables, 4 refs., 3 eqs. **DWB, DLC**—A consideration possibility of describing theoretically the daily variation of total radiation for a cloud-free sk utilizing the results obtained to present an adequately simple and reliable method of com theoretically the possible daily sums of global radiation. These formulas for computing ap mately total radiation for a cloud-free sky are presented and the results of computations are pared. These formulas are as follows:

$$(1)\quad F_2(0) = \frac{2 - \sec \vartheta_\odot}{2(1-A) - (\sec \vartheta_\odot - 2A)e^{\epsilon_1 \tau_0 (\sec \vartheta_\odot - 2)}} \times S_0 \cos \vartheta_\odot,$$

$$(2)\quad F_2(0) = \frac{2 - \sec \vartheta_\odot}{2 \sec \vartheta_\odot e^{\epsilon_1 \tau_0 (\sec \vartheta_\odot - 2)}} \times S_0 \cos \vartheta_\odot,$$

and

$$(3)\quad F_2(0) = \frac{S_0 \cos \vartheta_\odot}{1 + \epsilon_1 \tau_0 \sec \vartheta_\odot},$$

where $F_2(0)$ = flux of total radiation upon the earth's surface at zenith distance from the sun A = albedo of the earth's surface; $S_\odot$ = solar constant; ϵ_1 = part of radiation scattered back in re to direction of propagation, τ_1 = optical thickness of the atmosphere. The results of compa of two days of radiation observations at Kamennaia Steppe show that the daily variation of radiation flux for a cloud-free sky is most satisfactorily described by formula (3), if, for exa $\tau_1 \epsilon_0$ is determined from conditions of equality of observed and computed total radiation for a mass $\overline{m} = 2$. The expression of radiation flux given by formula (3) is easily integrated for the between sunrise and sunset. The daily potential total radiation can be calculated by mea GAL'PERIN'S formula (*Met. i Gidr.* No. 4, **1949**), if there exists only one measurement of total rad flux for $m = \overline{m}$ and a cloud free sky, necessary for computing $\epsilon_1 \tau_0$. If the dependence of this para upon conditions of atmospheric transparency is investigated beforehand the need for this observation disappears. A table giving the relative deviations of computed possible sums of radiation from observed values in %, is presented. *Subject Headings:* **1. Diurnal global radi variations 2. Global radiation calculation 3. Kamennaia Steppe, U.S.S.R.**—*I.L.D.*

10L–791 551.501.721:551.5

*Lossnitzer, H., **Studien uber das Himmelslicht. 2. Mitteilung.** [Study of sky light. P *Germany. Deutscher Meteorologischer Dienst im Französischen Besatzungsgebiet, Wissenschaf Arbeiten*, 2:66–78, **1950.** 12 figs., 13 refs. French summary p. 77–78. **DLC**—Measureme direct and diffuse radiation in Freiburg (1947–1948) are reported. Performance of instru and filters is discussed in detail and methods of measurement are described. Light distributio the sky, spectral structure and polarization of sky light, and their dependence on the turbidi lower atmospheric layers are investigated. It is found that as far as any individual case is conce no close correlation exists between diffuse radiation intensity and the atmospheric turbidity f as determined from measurements of direct solar radiation. *Subject Headings:* **1. Sky light pola tion measurement techniques 2. Actinometric data 3. Radiation measurements.**—*G.T.*

10L–792 551.50

Mörikofer, W. (*Physical-Met. Obs., Switzerland*), **Methods for the open-air measureme caloric radiation.** (In: Conference on the Use of Solar Energy, Univ. of Arizona, 1955, **Transact** pub. **1958.** Vol. 1:63–69.) **DWB**—A discussion of the measurement of heat energy is given only for its meteorological importance and heat economy of the atmosphere, but also fro significance in the exploitation of solar energy and for the understanding of the climatological c tions of the arid regions. The requirements of the stations from which the measurement carried out, the meteorological radiation fluxes and the requirements and characteristics o measuring device are described. *Subject Headings:* **1. Radiation measurement techniques 2. energy.**—*N.N.*

10L–793 551.501.721:551.508.93 551.510.53:551.521.3:551.5

*Murcray, David G.; Brooks, James N.; Murcray, Frank H. and Williams, Walter J., **At pheric absorptions in the near infrared at high altitudes.** Denver. Univ. Dept. of Physics, Con AF 19(604)-2069, Scientific Report No. 1, March 19, **1958.** 17 p. 7 figs., table, 6 refs., 3 Scientific Report No. 2, Dec. 8, **1958.** 13 p. 6 figs., photo, table, 6 refs., 9 eqs. Also pub *Optical Society of America, N. Y., Journal*, 50(2):107–112, Feb. **1960.** 7 figs., table, 7 refs., 10 **DWB, DLC**—The results of a flight with a balloon-borne infrared spectrograph are presented. spectra of the region from 1 to 5μ were obtained at altitudes 60,000-100,000 ft. The atmosp absorption data obtained from these spectra are compared with theoretical predictions of slant

ptions and with laboratory data for constant pressure path. It is found that, if the absorption ated as a function of Pw, the laboratory data and flight data can be fitted by relations of similar but with different constants. *Subject Headings:* **1. Atmospheric absorption measurement iques 2. Atmospheric absorption data.**—*Authors' abstract.*

10L–794 551.501.721:551.508.822:551.521.18

Pohl, Wolfgang (München), **Messungen des ultraroten Strahlungsstromes in der freien Atphäre.** [Measurement of the infrared radiation flux in the free atmosphere.] *Zeitschrift fur hysik*, Wurzburg, 22(1):1–52, **1956.** 14 figs., 13 tables, 30 refs., 20 eqs. German and English naries p. 1–2. **DLC** (QC801.Z4)—For abstract on same article from another source, *see* 9.5–111, 1958, *MAB*. *Subject Headings:* **1. Radiation meters 2. Infrared radiation measurement iques 3. Infrared radiation flux.**

METHODS OF OBSERVATION AND COMPUTATION OF AIR TEMPERATURE (551.501.724)

10L–796 551.501.724:551.524.7 551.501.75:551.557

Godson, Warren L. and Lee, Roy, **High-level fields of wind and temperature over the Canadian c.** *Beiträge zur Physik der Atmosphäre*, Frankfurt a.M., 31(1/2):40–68, **1958.** 23 figs., 8 refs. man, English and French summaries p. 40–41. **DWB, DLC.** Also: Godson, W. L., **High-level s of wind and temperature over the Canadian Arctic.** (In: McGill Univ. Arctic Meteorology arch Group, **Contributions to the study of the Arctic circulation.** Scientific Report No. 7 on its tract AF 19(604)-1141, March **1958.** p. 20–21.) **DWB**—In this study of high level fields of and temperature over the Canadian Arctic the synoptic charts being reported on do not reach s of 100 mb or above; instead, data for a small number of stations are analyzed. An analysis e time smoothed field of temperature at 100 mb shows that (1) extreme dissimilarities exist in the ution of the 100 mb temperature field between the winters of 1954/55, 1955/56 and 1956/57; he existence of "temperature waves" of long period (24–30 days) with an amplitude that inses with time as the 100 mb level becomes increasingly baroclinic; and (3) the culmination of e temperatures in the last 2 winters by a rapid cooling over a vast area of barotropic conditions, wed in turn by a rapid warming to near barotropic conditions (in the 1954/55 winter the baroic warm condition over a large area, occurred only in the Central Arctic); the rapid warming od (early Jan. 1955, late March 1956, early Feb. 1957), marked the end of winter in the Arctic osphere. Vertical cross sections of the vertical jet stream show that the atmospheric jet stream nerally found at around 70–75°N lat. although pronounced meridional movements result in its rrence as far south as 50°N. Maximum wind speeds occur above 50 mb and occasionally exceed knots. The rapid warming epoch in 1957 was the most spectacular at very high levels. Vertical sections of temperature have revealed major differences in the structure of these warming ods, whose dynamic processes are undoubtedly exceedingly complex. *Subject Headings:* **1. Upper emperature analysis 2. Upper air wind analysis 3. Canadian Arctic.**—*I.L.D.*

10L–797 551.501.724:551.524.7:613.693

Hirsch, Frederic G. (*Lovelace Foundation for Medical Educ. and Res., Albuquerque, New Mexico*), **perature measuring techniques for aviation physiological research.** (In: Lovelace Foundation Medical Education and Research, Albuquerque, N. M. **Aviation medicine: selected reviews.** don, **1958.** p. 113–124. 9 figs., 15 refs.) **DWB** (629.1323 N864a)—Man's tolerance for very temperatures is of great interest at present. In aviation physiology, it is important to know hat a pilot can be exposed and still survive. Most of the techniques available for the measuring recording of temperature employ a temperature-dependent change of an electrical characteristic me component of either a voltage or current measuring circuit. The most common are thermoples, thermistors, and resistance thermomemeters. Each of these is discussed briefly, in addition niscellaneous techniques (the so-called "Temp-Tape," and paints which either change color at icular temperatures, or which melt at certain temperatures). Finally, brief mention is made cerning the choice of a recording device to be used with any of the temperature measuring techues discussed in the article. *Subject Headings:* **1. Temperature measurement techniques 2. Aviamedicine.**—*N.N.*

10L–798 551.501.724:551.524.36

Johnston, D. W., **The estimation of maximum day temperature from the tephigram.** *Meological Magazine*, London, 87(1035):265–266, Sept. **1958.** 3 figs., 2 refs. **DWB, DLC**—In his er **Maximum day temperatures and the tephigram** (*Great Britain. Meteorological Office, Profesal Notes*, No. 63, **1933**) E. Gold gave estimates of the "monthly values of the thickness of a surface

layer expressed in millibars," which could be changed from an isothermal state at dawn to a of dry adiabatic lapse role in midafternoon as a result of solar radiation. The author suggests this manner of expressing the estimates in mb is more useful than the usual reference to squa the tephigram and that it leads to a simple graphical procedure of determining the day max temperature. The procedures for the cases in which convection cloud is not expected to develo those in which convection cloud is expected are outlined and examples of estimates of maximu temperatures are presented. *Subject Headings:* **1. Maximum temperature estimation 2. Teph analysis.**—*I.L.D.*

10L–799 551.501.724:551.511:55

McRae, J. N. (*Central Off., Melbourne*), **Geometric determination of mean virtual tempe or thickness on an aerological diagram.** *Australian Meteorological Magazine*, Melbourn 17:47–49, June **1957.** fig. **DWB**—A simple method is demonstrated for determining the vertical temp. of a layer of air with any given number of changes in lapse rate. It amounts t cessive determination of the mid-points of lines connecting the mid-points of the virtual tempe curve segments. *Subject Headings:* **1. Aerological diagrams 2. Virtual temperature calcul** —*M.L.R.*

METHODS OF OBSERVATION AND COMPUTATION OF WIND (551.501.7

10L–800 551.501.75:55

Giles, Keith C. (*General Mills, Inc.*), **Plotting upper-air winds.** *American Meteoro Society, Bulletin*, 39(9):475–476, Sept. **1958.** fig., ref. **DWB**—A description of Weems M aircraft plotter, a device to plot wind directions used at General Mills, Inc. A diagram of the p is reproduced. It is made of transparent plastic on which distance scales and a double scal tractor are marked. The working of the plotter is also described. *Subject Heading:* **1. Upp wind computation.**—*I.S.*

10L–801 551.501.75:551.5

Gould, R. C. and Ostrander, C. W. (*both, Atmospheric Studies Branch Instrument Oper Div. Test Dept.*), **A variable-baseline double-theodolite plotting board for computing winds** *U. S. Naval Ordnance Test Station, NOTS TP* 2176; NAVORD Report 6458, Oct. 9, **1958.** 4 figs. **DWB**—A double theodolite plotting board, the principle feature of which is a va baseline, is described, together with instructions for its use in computing winds aloft. *Headings:* **1. Winds aloft 2. Pilot balloon soundings 3. Plotting board 4. Double theo soundings.**—*Authors' abstract.*

10L–802 551.501.75:5

Lees, Sydney, **Rapid traverse wind measuring system.** United Research Inc., Camb Mass., Contract DA-36-039 SC-78139, First Quarterly Report, July 1–Sept. 30, **1958.** 43 p. erous figs., numerous tables, 3 refs., numerous eqs. **DWB**—A review of the requirements for a traverse wind measuring system is presented in Ch. 1. These include technical requiremer well as practical and operational considerations. Any proposed system must measure the cross components along the defined line within the allowable tolerances, by a technique that provid mobility, reliability, simplicity, flexibility and with the minimum number of new components. classes of techniques are described. One uses the projectile itself to make the measurements. other measures the displacement of a trail laid down by the projectile. In Ch. 2 the possibilit projectile measuring systems are reviewed. It is concluded that there are several severe diffic that will require a fairly extensive development program to overcome. The resultant system probably not be as simple as is desired. In Ch. 3 the possibilities of trail measuring system reviewed. These are divided into systems using radio frequency techniques and systems optical techniques. Optical techniques afford the best potentiality for obtaining a single sy in the shortest time. In particular, a stereoscopic system using infrared viewing compone recommended. Details of the stereoscopic system are developed in Ch. 4. The best solution ap to be one employing pairs of optical tracking heads. The trail should consist of separated sec or "points" of self illuminated particles. These can be discharged by the projectile durin traverse of the required path in space. A pair of optical tracking heads is suggested for each p The dimensions and dynamic requirements of the system are reasonable and readily satisfied existing components. Some work is necessary to obtain the desired pyrotechnical material fo "points" of the trail. A development program leading to a prototype of the system is outl *Subject Headings:* **1. Wind measurement techniques 2. Rapid traverse wind measuring syst** —*Author's abstract.*

10L–803 551.501.75:551.558

Mashkovich, S. A., **K voprosu o raschete vertikal'nykh tokov v atmosfere.** [Calculation of tical currents in the atmosphere.] *Moscow. Tsentral'nyi Institut Prognozov, Trudy*, No. 43(70): 33, 1956. fig., 2 refs., 20 eqs. **DWB, DLC**—Formulas are developed for calculating the vertical ocity of atmospheric movements on the assumption that temperature diminishes with height arly in the troposphere but remains constant in the stratosphere. Proceeding from the vortex ation the determination of vertical velocity w in the free atmosphere is reduced to the solution he following equations:

$$w+k_1(z)\Delta w=F(\theta,\lambda,z), \qquad k_1=\frac{(\gamma_a-\gamma)\,[b_2-(b_1c_2/c_1)\,]}{\rho(2wa\cos 45^\circ)^2}.$$

e solution of this equation is written in the series form:

$$w=\sum_n\sum_m\,[D_n{}^m(z)\cos m\lambda+D'_n{}^m(z)\sin m\lambda]P_n{}^m,$$

$$D_n{}^m=\frac{A_n{}^m}{1-k_1n(n+1)} \qquad \text{and} \qquad D'_n{}^m=\frac{B_n{}^m}{B_n{}^m}.$$

e application of this formula to actual computation is illustrated. *Subject Heading:* **1. Vertical nd velocity calculations.**—*I.L.D.*

10L–804 551.501.75:551.508.765

Matsumura, Nobuo, **On the calibration of a fog meters.** *Low Temperature Science, Sapporo, pan, Ser. A, Physical Sciences*, 11:67–73, 1953. 8 figs., 4 refs., 13 eqs. In Japanese; English mmary p. 73. **DWB**—It has been pointed out that in the calibration of a fog meter (determination the capturing coefficient) the turbulent motion of the wind must, in general, be taken into account. considering the fluctuation effect of the horizontal as well as vertical components of wind velocity semi-empirical basis, we obtained the result as shown by the formula:

$$M=0.11A\bar{\varphi}u^{1.65}\int_0^t\left[1+0.53\left(\frac{\Delta u}{u}\right)-0.70\left(\frac{\overline{w}+\Delta w}{\bar{u}+\Delta u}\right)\right]dt,$$

ere M =amount of captured fog water in time t; A =sectional area of the wire screen of a fog eter; $\bar{\varphi}$ =mean fog water contents for time interval t; u =horizontal component of wind velocity; =vertical component of wind velocity. The last (underlined) term represents the "cap-effect" d should be taken into consideration for winds whose inclination to the axis of the fog meter lies tween 0 and $\pi/2$. In order to obtain the required quantity $\bar{\varphi}$, the correction terms must be de- mined by measuring, simultaneously and at the same place, the fluctuations of wind velocity th in horizontal and vertical components, while $\bar{u}$ and M can easily be obtained from the record a new type recording fog meter. *Subject Headings:* **1. Fog meter calibration 2. Vertical wind locity calculations.**—*Author's abstract.*

10L–805 551.501.75:551.508.56/7

Mikhel', V. M., **O sovmestnoĭ aeroklimaticheskoĭ obrabotke sharopilotnykh i radiopilotnykh bliudenii.** [Simultaneous aeroclimatic analysis of pilot balloon and rawin observations.] *shkend, Geofizicheskaia Observatoriia, Trudy*, No. 11/12:62–70, 1956. 3 tables. **DLC**—A study wind direction extrapolation in presence of low clouds $\geqslant 8$ balls showed that simultaneous aero- matic analysis of pilot balloon and rawin observations can be successfully carried out for westerly nd directions. The results for easterly winds will be much less reliable. *Subject Headings:* **Upper air observation techniques 2. Extrapolation of pilot balloon measurements.**—*A.M.P.*

10L–806 551.501.75:551.557

Rosini, E., **Un metodo di confronto fra regimi anemologici.** [Method of comparing wind gimes.] *Associazione Geofisica Italiana, 7th Rome, Nov. 1957. Atti*, pub. Rome, (1958?). p. 115–4. 8 figs. Italian and English summaries p. 124.—A statistical and graphical method to compare nultaneous wind systems at two different locations or altitudes, is described, illustrated and scussed. The method is applied to two actual examples, one for Rome (Ciampino Airport) for ec.–Feb. (900, 800, 700, 500, 300 and 200 mb levels), and in the other case 2 stations, A and B, km from each other at Palermo Airport, (Punta Paisi). *Subject Headings:* **1. Wind regime analysis Upper wind regimes 3. Rome airport, Italy (Ciampino) 4. Palermo Airport, Italy.**—*M.R.*

10L–807 551.501.75:551

Rouaud, A., **Application d'une correction de sphéricité de la terre dans la détermination vecteur vent.** [Application of a correction of the earth's sphericity to wind vector determinati *Journal Scientifique de la Météorologie*, Paris, 8(32):117–132, Oct./Dec. **1956.** 8 figs., 4 ch 2 refs., eqs. French, English and Spanish summaries p. 117. **DLC**—Nomographs used at Fr aerological stations for corrective plotted wind vectors for effect of the earth's curvature are sented and explained. Equation from which the nomographs have been derived are inclu *Subject Headings:* **1. Wind vector calculations 2. Curvature corrections.**—*G.T.*

10L–808 551.501.75:551.555.4:551.571:58

Smirnova, S. I., **K metodike otsenki sukhoveev na nebol'shoĭ territorii.** [Method of evalua hot dry winds over a small territory.] *Meteorologiia i Gidrologiia*, Leningrad, No. 6:32, June 1 **DWB, DLC**—The procedure for characterizing an area with respect to the presence of hot and winds involves the following: Limiting critical values of atmospheric moisture deficit in indivi developmental phases of plants are determined and these serve as bench marks for the start of rec ing possible injuries to plants. In addition the amount of moisture supply in the soil and v velocity should be recorded simultaneously. The establishment of such indexes for the Ro oblast is illustrated. In order to prove the correctness of the moisture deficit values adopted f given region which are characteristic of hot dry winds, the number of days with daily mois deficit greater than the determined values are compared with the number of days with mois deficit greater than the normal interphase magnitude. *Subject Headings:* **1. Dry winds 2. Mois deficiency computation 3. Plant growth.**—*I.L.D.*

10L–809 551.501.75:551.553.8 551.5

Takahashi, K. (*Met. Res. Inst., Tokyo*), **On the decision of the design wind speeds and amount of precipitation by means of the Monte Carlo method.** *Meteorological Society of Ja Tokyo, 75th Anniversary Vol. of the Journal*, pub. Nov. **1957.** p. 399–402. fig., 2 tables, 2 **DWB, DLC**—Study discussing adequate design wind speed as one of the fundamental problems in prevention of storm disasters in Japan. The author calculates the design wind speed by m of the Monte Carlo method assuming minimum cost for unit time use. He develops the metho means of examples and determines the design wind speed for inland (Nagoya), cyclone area (Ak and typhoon area (Kagoshima). In the typhoon area 44 m/sec or 1.7 times the normal an maximum wind speed is found to be the best design wind speed assuming that the half decay pe of the strength of the building is 30 yrs. 1.6 and 1.9 times the normal annual maximum wind s are the best design wind speeds for half decay periods of 10 and 50 yrs. *Subject Headings:* **1. De wind speed 2. Monte Carlo method 3. Wind protection 4. Japan.**—*A.V.*

10L–810 551.501.75:551.557:551.507.25:623.8

U. S. Joint Task Force Seven, **Shipboard weather observing program, Operation Hardta 1958.** Its *JTFMC TP-9* **(1958).** 9 p. 5 figs. **DWB** (M07.2 U585sh)—During the 1958 nuc test series (Operation HARDTACK) conducted at the Eniwetok Proving Grounds, destroyers v extensively used as weather reporting ships with a primary requirement for upper wind observati A destroyer's capability to observe upper winds using 800 gram balloons with internal dipole flectors, shell-launched targets and HASP-launched targets was extensively tested. It is the pur of this publication to evaluate the destroyer's performance as a weather reporting station, to bri describe the procedures used and results obtained and to draw conclusions that may be usefu planning for similar operations. *Subject Headings:* **1. Upper air wind observation techniq 2. Weather ships.**—*Author's abstract.*

10L–811 551.501.75 551.557:551.5

Wobus, Hermann B., **Wind and pressure gradient computation with applications to traject computations.** (In: American Meteorological Society. District of Columbia Branch, **Proceedi of the Workshop on Stratospheric Analysis and Forecasting, Feb. 1–3, 1956.** pub. **1956.** p. 129– 6 figs., ref., 3 eqs.) **DWB**—The author presents scales for evaluating geostrophic and gradi equilibrium winds, including a series of wind scales "in which the force of the pressure grad represented by contour spacing, and the curvature parameter, represented by the oscillating circ arc, are totaled in the combined form for any one particular latitude." Their use in computing trajectories and balloon trajectories through the pressure contour fields of the upper troposp and the use of a damping effect upon geostrophic or gradient departure are discussed. *Su Headings:* **1. Wind gradient calculation 2. Pressure gradient calculation 3. Air trajectorie** *Based on author's abstract & I.L.D.*

THODS OF OBSERVATION AND COMPUTATION OF HUMIDITY (551.501.771)

10L–812 551.501.771:551.508.71

Pápai, László, **A nedvességmérés aerológiai kérdései.** [Aerological problems of humidity surement.] *Időjárás*, Budapest, 62(4):235–238, July/Aug. **1958.** table, 5 refs. **DLC**—In the garian Aerological Service humidity is measured with hygrometers using ordinary (unrolled) . The author discusses the sources of error (inertia of the hair, effect of ventilation, radiation, zing of interstitial water, etc.) which make this instrument unreliable for upper air measurement. st countries now use other methods of upper air humidity measurements, many of them hy- meters with rolled hair. *Subject Headings:* **1. Humidity measurement techniques 2. Rolled hair rometers 3. Hair hygrometers 4. Hungary.**—*G.T.*

METHODS OF OBSERVATION AND COMPUTATION OF PRECIPITATION (551.501.777)

10L–813 551.501.777:551.501.5

Jovičič, S., **Kako treba grafički uporedivati dugačke nizove osmatranja padavina radi interisanja i ispitivanja homogenosti podataka.** [Method of graphic comparison of long records of cipitation to interpolate and analyze the homogeneity of the data.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 6(1/2):58–61, Jan./June **1957,** 3 figs. **DWB**—Simple graphic interpolaas of data from nearby stations as a means of filling out incomplete records is explained. A tangular coordinate system is used for values which are expressed in averages (temperature, udiness, etc.), and a polar coordinate system for those expressed in additive amounts (precipitan, etc.). *Subject Headings:* **1. Graphic interpolation 2. Long period precipitation records 3. Hogeneity of data records.**—*G.T.*

METHODS OF OBSERVATION OF ATMOSPHERIC STRUCTURE BY RADAR AND RADIO (551.501.8)

10L–814 551.501.8:551.510.535

Eyfrig, Rudolf (*Inosphären-Institut Breisach im Fernmeldetechnischen Zentralambt der Deutschen ndespost, Breisach/Rh*), **Zur Kontrolle der Auswertung von Ionogrammen.** [Control of the aluations of ionograms.] *Geofisica Pura e Applicata*, Milan, 40:157–163, **1958.** 4 figs., 5 refs. nglish and German summaries p. 157. **DWB**—Due to the vast number of ionograms resulting m the IGY which need evaluation, fast mechanical or graphical methods of scaling, of checking testing the self consistency of the values, of rough statistical control, and of autocorrelation with tant stations are outlined in some detail and illustrated graphically. *Subject Headings:* **1. Ionoam data checking 2. Statistical control of ionospheric data.**—*M.R.*

10L–815 551.501.8:551.506.7:551.551

Shmeter, S. M., **O tochnosti vychislenii chisel Richardsona po dannym radiovetrovykh nabliudenii.** [Accuracy of calculations of Richardson's numbers from radio wind observations.] *Moscow. Tsentral'naia Aerologicheskaia Observatoriia, Trudy*, No. 22:32–34, **1957.** 2 tables, 3 eqs. **DWB**—Recent attempts have been made to relate bumpiness of airplanes to values of the Richardson number. order to determine the error in determinations of the Richardson number, the assumption is made at the temperature gradient is computed from radiosonde data and the wind gradient from radio lot balloon observations. The following formula is derived for $\sigma(Ri)$:

$$\sigma(Ri) = \pm \sqrt{2\left(\frac{g}{T\beta^2}\right)^2 \frac{1}{(\Delta H)^2}\sigma^2(T) + 8\left[\frac{g}{T\beta^2}(\gamma - \gamma a)\right]^2 \frac{1}{(\Delta H)^2}\sigma^2(v)}.$$

alculated values of mean square errors of Ri presented in a table indicate that when calculated om standard temperature and wind observations in the fall atmosphere Ri is subject to considerable ror. The principal cause of error in Ri values is the Garv accuracy of radio wind observations. *ubject Headings:* **1. Radio wind measurements 2. Richardson's number.**—*I.L.D.*

METHODS OF OBSERVATION BY USE OF SFERICS (551.501.83)

10L–816 551.501.83:551.515.4:621.396.663 (5–012)

Kimpara, Atsushi (*Res. Inst. of Atmospherics, Nagoya Univ., Japan*), **Atmospherics in the Far ast.** *Conference on Atmospheric Electricity, 2nd, Portsmouth, N. H., May 1958, Proceedings*, issued

1958. p. 565–581. 22 figs., table, 7 refs. **DWB** (M(055) C748pr)—The author has mad extensive series of observations of wave form and direction of arrival of atmospherics at se observatories in Japan for 5 yrs since 1952. The results are presented in two parts. In the a detailed description is given of the correlation of sources with thunderstorms, showers, snowsto cumulonimbi, cyclones, tropical depressions and storms, typhoons, fronts, troughs in the u atmosphere, etc. In Pt. 2 the distribution is shown of sources in the Far East as well as in the wes Pacific all the year round, specifically in tropical and subtropical Asia and Australia, the Indone Islands, the China Sea including the Philippines, etc., and an interpretation is given of the tribution from the meteorological point of view, especially regarding the convergence of air masse the intertropical and temperate fronts, the orographic lifting and strong insolational heating effe etc. *Subject Headings:* **1. Sferics direction data 2. Sferics source distribution 3. Far Eas** *Author's abstract.*

10L–817 551.501.83:621

Maeda, Ken-ichi and Kimura, Iwane (*both, Electronic Engineering Inst., Kyoto Univ.*), **A th retical investigation on the propagation path of the whistling atmospherics.** *Japan. Sci Council. Ionosphere Research Committee, Report of Ionosphere Research in Japan,* 10(3):105– **1956.** 8 figs., 2 tables, 11 refs., 39 eqs. **DWB**—This work is an attempt to calculate exactly the path of thunderstorm whistlers. Modified formulas based on Fermat's principle are used here demonstrate that interpretation of the presently observed facts can be accomplished. The ray p is calculated from various geomagnetic latitudes, with due consideration to electron density tribution in outer ionosphere. The ray path generally does not follow the lines of the magn force and in particular not in the lower latitudes. The results are presented graphically and in tab *Subject Headings:* **1. Whistlers 2. Sferics propagation.**—*W.N.*

10L–818 551.501.83:523

Merino y Coronado, J., **Los registradores de estática y la detección de las llamaradas sola** [Recording of sferics and detection of solar flares.] *Mexico (City). Universidad Nacional. stituto de Geofísica, Anales,* 4:13–26, **1958.** 9 figs., 6 refs. English summary p. 13.—The auth experience shows that it is comparatively easy to detect and record solar flares using the same equ ment used to record atmospheric static noises. The circuits of two instruments suitable for purpose (according to the author's personal experience) are given. One of them uses regular tu and was in operation for some 15 yrs, while the other, extensively used in U. S. during the Int national Geophysical Year, is entirely transistorized. A typical record is given, in order to show difference between man made interference and sudden enhancement of atmospherics due to a sc flare. *Subject Headings:* **1. Sferics 2. Solar flares.**—*Author's summary.*

10L–819 551.501

Morgan, Millett G., **Whistler studies at Dartmouth College.** *American Geophysical Uni Geophysical Monograph,* No. 2:31–34, **1958.** fig., 3 refs. **DLC**—The author reviews the history the discovery of whistlers which are audio frequency radio waves arising from lightning flash The first report was made by J. A. RATCLIFFE in 1952, followed by STOREY's deductions that whistl result from the propagation of the very low frequency energy radiated by a lightning flash along t flux of the earth's magnetic field for above the earth, and down again to the symmetrical point in t opposite hemisphere. Finally came the confirmation of STOREY's assumption of the minimum el tron density by studies on zodiacal light. This history is followed by an account of (1) simultane observations at Hanover, N. H., and Washington, D. C.; (2) conjugate point experiments in N Zealand and the Aleutian Islands; (3) the discovery and characteristics of multiple whistle (4) correlation of visual observations of lightning with whistlers; (5) the correlation of visual o servations of aurora and very low frequency (VLF) emissions; (6) the relationship of the solar fl of Feb. 23, 1956 and the propagation of VLF emissions and (7) of the IGY preparations for observ tions on whistlers including location of observations, stations and equipment refinements. *Subj Heading:* **1. Whistlers.**—*I.L.D.*

10L–820 551.501.83:551.59

Yuhara, Hiroo; Ishida, Toru and Higashimura, Masaichi, **Measurement of the amplitu probability distribution of atmospheric noise.** *Japan. Radio Research Laboratories, Journ* 3(11):101–108, Jan. **1956.** 7 figs., table. **DWB**—New equipment described in this paper h certain advantages over the usual method of measuring the amplitude probability distribution atmospheric noise. Atmospheric noise was observed with this instrument on the frequency 3.5 M in the summer of 1955. The result was the conclusion that the probability distribution of atm pheric noise amplitude corresponds to a superposition of Rayleigh and log normal distributio *Subject Headings:* **1. Sferics instruments 2. Sferics distribution.**—*N.N.*

CONSTRUCTION AND MAINTENANCE OF OBSERVATORIES, SITES, ETC. (551.501.9)

Amateur Observation

10L-821 551.501.9

Poncelet, Lucien, **Le rôle de l'amateur dans l'observation météorologique.** [The role of the amateur in meteorological observation.] *Ciel et Terre*, 68(7–8):165–174, July–Aug. **1952.** **DWB**—In this popular lecture delivered to the Amateurs' Section of the Belgian Society of Astronomy, Meteorology and Geophysics, the hardships imposed upon the nonprofessional meteorologist by the exacting task of continuous observation are outlined. The example of Albert Cheux, owner and operator of a private meteorological station near Angers, France, is offered as fine evidence of exceptional enthusiasm and perseverance. *Subject Headings:* **1. Amateur observation 2. Cooperative observers 3. Meteorological stations.**—*G.T.*

10L-822 55.501.9

Whiten, A. J., **The amateur at work.** *Weather*, 7(8):237–241, Aug. **1952.** 5 refs. **DWB**—Account of researches in meteorology which can be carried out with inexpensive equipment. *Subject Heading:* **1. Amateur observation.**—*C.E.P.B.*

10L-823 551.501.9

Žak, A., **Osmatranje vremena bez instrumenata.** [Weather observation without instruments.] *Yugoslavia. Hidrometeorološka Služba, Vesnik*, 1(3/4):45–46, July/Oct. **1952.** Radošević, M., **Amaterizam u meteorologiji.** [Voluntary work in meteorology.] *Ibid.* p. 47–48. **DWB**—In the first article a rating system is explained in which 6 meteorological elements are rated from 0–5 and the six ratings are added up to an index number representing weather quality. In the second article the application of this rating system is recommended to voluntary observers. The lack of interest in voluntary observation in Yugoslavia is deplored and examples of its popularity in other countries are quoted. *Subject Heading:* **1. Amateur observation.**—*G.T.*

Arctic And Antarctic Stations

10L-824 551.501.9:551.506.22(99)

Bender, J. A. (*Snow & Branch, SIPRE*), **Deep core drilling program: Byrd Station, Antarctica.** *American Geophysical Union, Transactions*, 39(5):1021–1023, Oct. **1958.** 4 tables. **DWB, DLC**—The U. S. Army Snow, Ice and Permafrost Research Establishment conducted drilling operations at the Greenland Ice Cap station during the summers of 1956 and 1957. The techniques used, the analysis of cores and the temperature measurements are recorded in this report. *Subject Headings:* **1. Snow, Ice and Permafrost Research Establishment (SIPRE) 2. Deep core drilling data 3. Byrd Station, Antarctica.**—*N.N.*

10L-825 551.501.9(98)

Burkhanov, Vasiliĭ Fedorovich, **Novye sovetskie issledovaniia v Arktike.** [New Soviet research in the Arctic.] Moscow, Gos. Izd-vo Geogr. Lit-ry, **1955.** 51 p. figs., foot-refs. **DLC** (G630.R8B83)—Russian explorations in the Central Arctic Basin are described and the recent drifting expeditions since 1937 emphasized. The work of the "Severnyi Polius" (North Pole) 2, 3 and 4 drifting expeditions of 1954 and 1955 are fully described and illustrated. Ice and bathymetric studies were of major importance. Plans for 1955–56 expedition are mentioned. *Subject Headings:* **1. Ice drift stations 2. "Severnyi Polius" Expedition, 1954–1955 3. Soviet Arctic expeditions 4. Arctic Basin.**—*M.R.*

10L-826 551.501.9(99) 551.582.2(99)

*Flowers, Edwin (*U. S. W. B.*), **Inside Antarctica, No. 2, Amundsen-Scott Station.** *Weatherwise*, Boston, 11(5):166–171; 180, Oct. **1958.** 3 figs., 2 tables. **DWB**—Notes on experiences at the South Pole Meteorological Station, 90°S, accompanied by tables of monthly and annual data for 1957, wind frequency data, and an isothermal chart for Antarctica for June 1958. The cold pole of Antarctica is slightly toward the E (90° Meridian) side of the continent from the Pole. Even at temperatures of −94°F, winds of over 16 knots occurred. These winds came from the colder sector of the continent and were the coldest known since cold advection was not compensated by adiabatic heating. Winter (esp. June) was the windiest season. Observation under such conditions was extremely difficult. Rawinsonde balloons were released after March 27, 1957, and twice a day after mid-April. Snow gage measurements at surface and at 30 ft elevation in most cases are compared for each month from July-Oct., showing 5 to 14 times as great a catch at the surface due to drifting snow. *Subject Headings:* **1. South Pole Weather Station, Antarctica 2. South Pole, Antarctica.**—*M.R.*

10L–827 551.501.9:551.311.184(

Iakovlev, Gurii Nikolaevich, **Ispytanie muzhestva: dnebvnik poliarnika.** [Test of manline an Arctic diary.] Moscow, Gosud. Izdvo. Geograficheskoi literatury, **1957.** 260 p. figs., phot **DWB** (919.8 I11is)—Diary notes of a staff member of the drifting station "North Pole 2" who sp 376 days from April 1, 1950 -April 12, 1951 at the drifting station. The author describes the strenuc daily lives of expedition members, the peculiar conditions of work and rest of the scientific wo *Subject Headings:* **1. Ice drift stations 2. "Severnyi Polius" Expedition, 1950/51 3. Soviet Arc expeditions 4. Arctic Basin.**—*A.M.P.*

10L–828 91.04(99) 551.506

Markov, Konstantin Konstantinovich, **Geograficheskie issledovaniia v Antarktide.** [G graphical investigations in the Antarctic.] Moscow, **1957.** 25 p. Text in English and Russi Added t-p. in English. **DLC** (G860.M3)—Personal impressions and account of experiences of t author while with the first two Soviet (1956–57) Antarctic Expeditions are recounted in this popul literary address delivered before the 6th World Festival of Youth and Students of Geography held Moscow, July 1957. The haunting beauty, the intense cold, the great desolation of shelf ice and t contrasting "oases" of rock-islands are among the more vivid impressions recollected by the auth who also gives an account of the pioneering work done at Mirny, where the first Soviet meteorologi observatory was set up and the foundation for future scientific research was laid out. *Subj Headings:* **1. Soviet (Mirny) Antarctic Expedition, 1956–57 2. World Festival of Youth and Stude of Geography, Moscow, 1957.**—*R.P.*

10L–829 551.501.9:551.326.7(9

Pravda (Moscow), [**Soviet drifting stations in the Arctic.**] (Selections from *Pravda*, N 119, 171, 199, 233, 237 and 283, **1954**: No. 96, **1955**; and No. 79, **1957.**) Translations into English Michael Dane and David Kraus. Issued by American Meteorological Society under Contr AF 19(604)-1364, and AF 19(604)-1936, May **1955,** July **1955,** June **1957.** 40 p. typescrip Contents: **V prezidiume Akademii Nauk SSSR.** [In the Presidium of the Academy of Sciences the U.S.S.R.], *Pravada*, No. 119(13052), April 29, **1954.** 3 p. Vavilov, V.: **Letchiki vysoki shirot,** [High latitude flyers], *Pravda*, No. 171(13104), June 20, **1954.** 2 p. Burkhanov, V.: **Nauchn issledovatel'-skie raboty v Arktike v 1954 godu,** [Scientific research in the Arctic in 1954], *Prava* No. 199 (13132), July 18, **1954.** 3 p. **Budni dreifuiushchikh nauchnykh stantsii,** [A workday the drifting scientific stations], *Pravda*, No. 233(13166), Aug. 21, **1954.** 2 p. **Na dreifuiushch nauchnoi stantstii,** [At the drifting scientific stations], *Pravda*, No. 237(13170), Aug. 25, 195 3 p. Treshnikov, A. F.: **V poliarnuiu noch'. Pis'mo s nauchnoi dreifuiushcheĭ stantsii "Severn Polius-3,"** [Into the polar night. A letter from the scientific drifting station "North Pole-3" *Pravda*, No. 283(13216), Oct. 10, **1954.** 2 p. Burkhanov, V.: **Nauchno-issledovatel'skie raboty tsentral'noĭ Arktike,** [Scientific research work in the Central Arctic], *Pravda*, No. 96(13394), April **1955.** 2 p. **Na dreifuiushchikh stantsiiakh Arktiki,** [At the Arctic drifting stations], *Pravd* No. 79(14108), March 20, **1957.** 2 p.—The first of the eight papers translated here is an accou of Soviet scientific accomplishments in the Central Arctic region. The second paper describes t comradship existing between the Arctic airmen and the scientific crew on land and sea within t Soviet sector of the Arctic. The third paper is devoted to a review of the 1954 High Latitud Expedition, followed by paper four which describes a busy day aboard the "North Pole 4" statio This continues in paper six, which gives a very brief account of the daily activities aboard statio "North Pole 4." The next article describes how fine everything is aboard station "North Pole 3 whose crew has pledged to erase all the "white spots" existing on the synoptic charts of the Arct Basin. This they will do during 1954. Paper seven is a description of the activities aboard t stations "North Pole 3" and "North Pole 4" and, finally, in the eighth paper a *Pravda* journali describes in general terms the U.S.S.R. activities during the High Latitude Expedition 1954, base on his interview at the Chief Administration of the Northern Sea Route. There are no specific dat given in these papers. *Subject Headings:* **1. Soviet drifting stations 2. Translations 3. Arct Basin.**—*W.N.*

10L–830 551.507.2:551.326.7(98

Untersteiner, Norbert (*Univ. of Wash.*) and English, T. Saunders (*Univ. of Alaska*), **Summe activities—Drifting Station Alpha.** *American Geophysical Union, Transactions*, 39(6):1213–121 Dec. **1958. DWB, DLC**—The successful operation of the scientific program at Drifting Statio Alpha, one of U. S.-IGY Arctic stations, has been reported. There was no interruption despit severe logistic problems. The necessary data that were evaluated were obtained directly fro observations of the transmitted radiation. Sea ice physics and glaciology were also investigate here during the 1957–1958 season. Measurements of vertical distribution of ocean temperatur and salinity, which affect sound transmission, were also made. *Subject Headings:* **1. Drift ice meteoro logical stations 2. Drifting Station Alpha 3. U. S. participation in IGY 4. Arctic.**—*N.N.*

High Altitude Stations

10L–831 551.501.9:551.43 551.586:612

Endlich, Bruno (*Basel*), **Hochalpine Forschungsstation Jungfraujoch.** [The Jungfraujoch gh Alpine Research Station.] *Naturwissenschaftliche Rundschau*, Stuttgart, 11(7):272–274, y 1958. **DWB, DLC**—An account is presented of the beginning of Alpine Research in 1886 under stimulus of Julius von Hann, the founding of the Hochalpine Forschungsstation Jungfraujoch in 31, and of the more important research studies that have been carried out during the past quarter ntury. This paper is based on the publication **25 Jahre Hochalpine Forschungsstation Jungfraujoch,** ed. by Alexander V. Muralt (*Experientia*, Supplement VI, **1957.**) The author reviews the re important studies in physiological climatology, especially the physiological reaction and acmatization of the body to high altitude; the work on stellar spectra, in particular in the wave igths between 0.3μ and red; cosmic radiation research which led to the first demonstration of the meson in 1951 by P. M. S. Blackett, etc.; analysis of the solar spectrum; radiation of the night y; stmospheric electricity and glaciological research. *Subject Headings:* **1. Hochalpine Forschungsation Jungfraujoch 2. High altitude research stations 3. High altitude acclimatization 4. Physigical climatology.**—*I.L.D.*

10L–832 551.501.9:551.43

Kliukin, N. K., **Vysokogornaia meteostantsiia v verkhov'iakh Kolymy.** [Meteorological ountain station near the upper course of the Kolyma.] *Priroda*, Moscow, 46(4):55–58, April **1957,** noto. **DLC**—Report on methods of selecting a site, and first organizational step in the building and uipping of a high mountain meteorological station on a platform (2050 m high) of Mus-Klaia ountain (Suntar Khaiat Mountain Chain), carried out in 1956 by the Kolyma Administration of e U. S. S. R. Hydrometeorological Service. *Subject Headings:* **1. Mountain meteorological stations Meteorological instruments 3. Mus-Klaia Mountain, U.S.S.R.**—*A.M.P.*

10L–833 551.501.9:551.586:612.014.4

Sky High. *Science*, Wash., D. C., 126(3276):692, Oct. 11, **1957.**—The University of California's onner Laboratory, the Atomic Energy Commission and private donors are supporting the building a new laboratory 17,000 ft high in the Bolivian Andes. In this laboratory Bolivian and American ientists will carry on research concerning the effect of altitude on the human and animal body. An nalysis of much of the biological material collected at this laboratory will be made in California. *ubject Headings:* **1. High altitude research stations 2. Physiological climatology 3. Bolivian ndes.**—*N.N.*

Homogeneity of Records

10L–834 551.501.9 551.501.42:551.506.3(498)

Avădani, Ana, **Despre schimbarea calendarului.** [The calendar reform.] *Meteorologia si Hidrologia*, Bucharest, 2(3):74–75, July/Sept. **1957. DWB**—In 1919 a shift of 13 days was made in he calendar used in Romania. The present territory of Romania includes parts of the former Austrian-Hungarian Empire where calendar reform has been in effect since 1582. Adjustments which have to be made in comparing hydrological records before 1919 for various parts of Romania re briefly discussed and illustrated by an example. *Subject Headings:* **1. Calendar reforms . Homogeneity of hydrological records 3. Romania.**—*G.T.*

10L–835 551.501.9:551.506

Brooks, Charles Franklin, **Note on the homogeneity of climatological records.** *Blue Hill Meteorological Observatory, Reprint*, No. 2, **1954.** 3 p. 6 refs.—Careful planning and good judgment re necessary to insure long homogeneous climatological records from a network of basic stations. gnorant new administrators occasionally spoil valuable records by changing locations or closing tations. Blue Hill Meteorological Observatory is an example of one of the best stations in this espect. A warming in winter temperatures of 3°F is observed through records which have been ept since 1885. *Subject Headings:* **1. Homogeneity of records 2. Station location 3. Climatic ecords 4. Blue Hill Meteorological Observatory, Cambridge, Mass.**—*A.A.*

10L–836 551.501.9:551.582.2(494)

*Uttinger, H. and Schüepp, M. (*Swiss Met. Inst. Zurich*), **Zur Reduktion klimatischer Mittelwerte on Zürich auf die neue Beobachtungsstation Krähbühlstrasse der Schweizerischen Meteorologischen Zentralanstalt.** [Reduction of climatic averages at Zurich to those of the new K-Observation Station of the Swiss Central Meteorological Office.] *Switzerland. Meteorologische Zentralanstalt Annalen*, v. 87, Anhang No. 6, **1950.** 6 p. 2 figs., 6 tables. **DWB**—A systematic discussion of the nethods used to reduce pressure, temperature and sunshine duration records made at the Physics

Laboratory Building of the University of Zurich, No. 35 Iloriastrasse to the new Central Observat Building at No. 58 Krähbühlstrasse, a horizontal distance of 966 m and vertical distance of 71–8 with illustrative tables and graphs. The removal was effected in Aug. 1949, and comparat readings were made for 2 yrs (1944–45). The greatest effect was noted in temperature reco Comparison is made for period 1864–1940, and also for Swiss normal period 1901–40. *Sub Headings:* **1. Climatic normals 2. Homogeneity of records 3. Station removals 4. Zurich, Switz land.**—*M.R.*

International Geophysical Year

10L–837 551.501.9:551.510.534 551.508.9

Gushchin, G. P., **Issledovanie atmosfernogo ozona.** [Investigations of atmospheric ozon *Akademiia Nauk SSSR. Mezhduvedomstvennyĭ Komitet po Provedeniiu MGG (IGY), Inf matsionnyĭ Biulleten'*, No. 5:37–39, **1958.** fig. **DWB**—In order to study atmospheric ozone dur the IGY, six ozone measuring stations were established in the U. S. S. R. (Voeikovo, Leningrad Ob Alma-Ata; Vladivostok; Dixon Island, Abastuman and Elbruz). There are also ozone measur stations of earlier origin operating in the U.S.S.R. The work on ozone measurement is directed the Central Geophysical Observatory. For observing the ozone content of the atmosphere, 11 pho electric ozonographs with light filter systems and night attachments were constructed in the Leningr State University. This apparatus is described. The light filters were calibrated with the Dobs light meter. A double quartz monochrometer for determining ozone by comparing the intensities two narrow spectral regions in the ultraviolet was built in the Central Aerological Observatory. airplane ozone meter was developed for making observations on days with continuous cloud cov A graph showing the variation of total ozone content at Voeĭkovo for several months during 1956–19 is presented. The use of the standard ozone measuring apparatus (Dobson spectrophotomet serves to distinguish the absorption of ultraviolet by ozone from that by aerosols. *Subject Headin* **1. IGY ozone networks 2. Ozone measurement instruments 3. Soviet participation in IGY.**—*I.L.*

10L–838 551.501.9:551.506.22(9

Humbert, J., **Travaux d'équipement des Iles Kerguelen pour l'Année Géophysique Internationa** [The fitting out of Kerguelen Islands for activities of the International Geophysical Year.] *Fran Ministère de la France d'Outre-Mer, Terres Australes et Antarctiques Francaises*, Paris, No. 4/5:41–4 July/Oct. **1958.** 6 figs. **DLC**—Description of unique features of the installations at Kerguel Islands: lodgings, laboratories, screens and scientific equipment for participation in the Internation Geophysical Year Program. *Subject Headings:* **1. French participation in IGY 2. IGY antarc stations 3. Kerguelen Islands.**—*A.V.*

10L–839 551.501.9:551.510.535(9

Khrgian, A. Kh., **Ionosfernaia stantsiia na ostrove Dikson.** [Ionospheric observation stati on Dickson Island.] *Akademiia Nauk SSSR. Mezhduvedomstvennyĭ Komitet po Provedeni Mezhdunarodnogo Geofizicheskogo Goda, Informatsionnyĭ Biulleten'*, No. 3:93, **1957. DLC**— accordance with the IGY program a station for the study of ionospheric layers in the western sect of Soviet Arctic, their change in various seasons (on disturbed and calm days), as well as for the o servation of electromagnetic waves absorption, is being organized on Dickson Island by the Arct Institute and Moscow State University. *Subject Headings:* **1. IGY ionospheric program 2. Sovi Arctic research 3. Soviet participation in IGY 4. Dickson Island Station.**—*A.M.P.*

Meteorological, Climatic, And Special Networks

10L–840 551.501.9:551.521.12(45) 551.506:551.521.1

*De Pasquale, Oreste, **Misure della radiazione globale da parte della rete attinometrica A.M Italiana.** [Measurement of global radiation by the actinometric work of the Aviation Weath Service.] *Rivista di Meteorologia Aeronautica*, Rome, 18(3):18–34, July/Sept. **1958.** 2 figs tables, 4 refs., eq. Italian, French, English and German summaries p. 18. **DLC**—Observatio with a Robitzsch-Fuess actinometer made at 24 stations of the Italian Air Weather Service Radiatio Network are summarized for July 1955–Dec. 1956. Charts of Italy, Sicily and Sardinia for each the 18 months show isopleths of mean daily global radiation. Mean and extreme daily values a given in a table for each month or season. *Subject Headings:* **1. Actinometric data 2. Italian act nometric network 3. Global radiation data 4. Italy.**—*M.R.*

10L–841 551.501.9:551.582(749

Carter, Douglas B., **The microclimatic net.** *Johns Hopkins Univ. Laboratory of Climatolog Publications in Climatology*, 7(2):313–319, **1954.** 2 figs., 3 tables, 6 refs.—The unusually dens

vork of stations, reporting daily extreme temperatures and rainfall around Seabrook is described. means are given for the hourly probability of rain and the average precipitation for rainy hours eabrook, as well as monthly temperatures in the whole network. *Subject Headings:* **1. Climatic works 2. Diurnal variation of precipitation 3. Seabrook, N. J. 4. New Jersey.**—*A.A.*

10L–842 551.501.9(477)

Guk, N. I., **Kievskaia meteorologicheskaia observatoriia i mestnye meteorologicheskie seti.** iev Meteorological Observatory and local meteorological networks.] *Kiev, Ukraine. Ukrainskii ichno-Issledovatel'skii Gidrometeorologicheskii Institut, Trudy,* No. 5:15–25, **1956.** 25 refs. **B, DLC**—The role of the Kiev Meteorological Observatory in the development of local networks meteorological stations set up by local agricultural, scientific and industrial organizations of th Russia, in addition to the network of the Main Geophysical Observatory of Russia, in the od 1880–1913 is described and discussed. *Subject Headings:* **1. Meteorological networks 2. Kiev teorological Observatory 3. U.S.S.R.**—*A.M.P.*

10L–843 551.501.9:551.585:551.588

Harshbarger, H. B. (*Office of Climatology, U. S. W. B., Wash., D. C.*), **Station networks to sample climate.** *U. S. Weather Bureau, Weekly Weather and Crop Bulletin,* 43(28):7–8, July 9, **1956.** gs. **DWB, DLC, DA**—A graph shows the number of observing stations each decade since 1842 he U. S. From 4000 in 1910 it has increased to 5000 in 1940 and 11,000 in 1950. In recent rs an effort has been made to develop a rational network of one station per 600 sq mi. A graph ws the distribution of climatic stations with respect to length of record. Only a small % have 0 yrs of continuous record. To remedy the defects due to personal element in length of record, a l system is being worked out, one a basic network which will be kept intact, and one which might changed every 5 or 10 yrs. An even more select network will be one of Bench Mark stations to e information on climatic changes. These have been tentatively selected and are shown on a rt. *Subject Headings:* **1. Meteorological networks 2. Climatological Bench Mark networks United States.**—*M.R.*

10L–844 551.501.9(52) 551.515.2(52)

*Japan. Ministry of Foreign Affairs, **Meteorological and oceanographic observations in Japan.** okyo], **1948.** 11 p. 4 charts, tables. **DLC**—In this pamphlet describing the network and servatories for meteorological and oceanographic observations in Japan and associated island as, and emphasizing the need for a better and more centralized network, there are a number of rts showing typhoon danger areas, typhoon tracks 1941–42, as well as fog, ice and warm or cold rent areas, etc. In the text the damage and casualties from the Muroto Typhoon (Sept. 21, 1934) houses, ships, agriculture, forestry, fisheries, commerce, industry and railroads; the average annual nage to ships, land and improvements, respectively, due to weather disasters in Japan (floods, al waves and storms) for the period 1926–36 are tabulated. The importance of good reports for ecasting and warning of such disasters is stressed. *Subject Headings:* **1. Typhoon damage Meteorological networks 3. Typhoon, Muroto (1934) 4. Japanese Islands.**—*M.R.*

10L–845 551.501.9:551.510.42

Leavitt, J. M.; Pooler, F., Jr. et al. (*all, R. A. Taft Sanit. Engin. Center, Cincinnati, Ohio*), **sign and interim meteorological evaluation of a community network for meteorological and air ality measurements.** *Air Pollution Control Association, Proceedings,* Vol. 50, **1957.** Issued **1958?** per No. 31 [6 p.] 5 figs. **DWB** (M10.42 A298ap)—An air quality and meteorological measuring twork was designed to serve particular needs in the study of air pollution in the city of Louisville, y. Preliminary results indicate that the network data do qualitatively describe the air flow and quality patterns. This qualitative understanding was necessarily preliminary to more quantitative descriptions. *Subject Headings:* **1. Meteorological networks 2. Atmospheric pollution measurement 3. Louisville, Ky.**—*Authors' summary.*

10L–846 551.501.9:551.509(470)

Rubinshteĭn, E. S., **Printsipy razmeshcheniia seti meteorologicheskikh stantsiĭ.** [Principles of teorological network density.] (In:Vsesoiuznoe Geograficheskoe Obshchestvo SSSR, **Voprosy eografii.** Moscow, **1956.** p. 179–189. 2 figs., 9 refs.) **DWB, DLC** (G58.G35)—The theoretical inciples of the density of meteorological station distribution, which boil down to the problem of the ssibility and accuracy of interpolation, are expounded, reviewed and discussed in the light of recent vestigations in this field by the Soviet scientists Kolmogorov, Khinchii, Obukhov. Special tention is given to the joint work of O. A. Drozdov and A. A. Shepelevskiĭ on the theory of interlation of meteorological elements and its application in the organization of the network. Distances tween various weather stations of the Soviet network, under reorganization, now are indicated. *bject Headings:* **1. Meteorological networks 2. Network density 3. U.S.S.R.**—*A.M.P.*

10L–847 551.501.9:551.578.4

Villeneuve, G. Oscar (*Dir. Met. Bureau, Quebec*), **Bulletins officiels d'enneigement de la Pro de Québec.** [Official snow bulletins of the Province of Quebec.] *Quebec (Province). Bure Météorologie, Bulletin*, No. 25, **1953.** 32 p. English transl. issued as its *Bulletin*, No. 25-A, 31 p. **DWB**—The Snow Condition Report Service jointly operated by the Meteorological Bu and the Publicity Bureau of the Province of Quebec is described. The meteorological network of stations), work of the observer, terms used in the bulletins, processing of data, distributio reports (list of over 200 recipients in Canada and the U. S., such as newspapers, radio stat travel agencies, etc.) are discussed. The history of the service is outlined. *Subject Head* **1. Meteorological networks 2. Snow reporting services 3. Quebec.**—*G.T.*

10L–848 551.501.9:551.508

†Lugeon, Jean and Ackermann, Paul, **Les anomalies du réseau aérologique européen.** [Irr larities of the aerological network of Europe.] *Switzerland. Meteorologische Zentralanstalt, Ann* Vol. 92, 1955, pub. **1956,** Anhang. 31 p. 7+figs., 6 tables, 22 refs. Abstracted from rep Also their: **Homogénéité du réseau européen de radiosondages.** [Homogeneity of the Euro radiosonde network.] [Reprint from] *World Meteorological Organization, Technical Note*, No **1955(?).** 11 p. 7 figs., 2 refs., eqs. Text in French, English, Spanish and Russian. **DWB, DL** As a result of a survey made by the WMO Commission on Aerology, positions of more than s radiosonde stations throughout Europe are listed along with the type of radiosonde used and presence or absence of radiation correction. For each of the stations the monthly mean thickne the 850–500 mb and 500–300 mb layers and its 12 and 24 hourly variance is given for the 6 mo periods Oct. 1953-March 1954 and April–Sept. 1954. *Subject Headings:* **1. Radiosonde netv homogeneity 2. Radiosonde networks 3. Europe.**—*G.T.*

10L–849 551.501.9:551.508.77:51

*Hamilton, Everett L. and Reimann, Lyle F. (*both, Div. of Watershed Management Res.*), **Sim fied method of sampling rainfall on the San Dimas experimental forest.** *U. S. Forest Ser California Forest and Range Experiment Station, Technical Paper*, No. 26, Oct. **1958.** 8 p. 3 tables. **DWB** (634.9 U583t)—Some hydrologic studies of the rainfall on the mountain watersh of the San Dimas Experimental Forest have been made since 1933 when a network of 322 rain ga was installed in order to establish some data on the precipitation pattern in the area. Later rain gage network was reduced from 322 to 77, and finally to 21. This report contains a tabul summary of least squares computations to test the adequacy of minimum network rain gages, number of storms by storm size class in which minimum rain gage network average differed f tilted rain gage network average by more or less than 5%, as well as the % deviations of the ann averages, by storm size class. Data on all the storms and the results of each watershed investiga are given. *Subject Headings:* **1. Rain gage networks 2. Forest hydrology 3. San Dimas Exp mental Forest, Calif.**—*N.N.*

10L–850 551.501.9:551

Wilkinson, Jackson H. (*Hydraulic Data Branch, TVA, Knoxville, Tenn.*), **Study of rain station locations in south Chickamuga Creek watershed.** *American Geophysical Union, Transactio* 36(6):1021–1028, Dec. **1955.** 2 figs., 2 tables **DWB, DLC**—A 428-sq mi watershed was studied the purpose of determining the number and location of reporting rainfall stations needed to prov the desired accuracy of average watershed rainfall for stream flow prediction purposes. Data storms occurring during a 12-month period are analyzed and a chart presented which shows probable difference from average watershed rainfall to be expected for winter storms when vari numbers of best and random stations are used to estimate rainfall. *Subject Headings:* **1. Rain networks 2. Precipitation estimation 3. Chickamuga Creek, Tenn.**—*Author's abstract.*

10L–851 551.501.9:551.501

Rogers, P., **Sferics in the Sudan.** *World Meteorological Organization, WMO Bulletin*, 5 159–160, Oct. **1956.** fig. "Based on report by A. A. Wahab, dir. of the Sudan Meteorolog Service." **DWB**—A network for sferics reporting, using British type cathode ray direction finc (CRDF) was begun in the Sudan about 2 yrs ago, with a control station at Khartoum. Observati are made every hour of the day and bearings telegraphed by a simple code to Khartoum within ½ Reports are used to aid forecasters in predicting thunderstorms, since reporting stations are so sca in many parts of the Sudan. *Subject Headings:* **1. Sferics networks 2. Thunderstorm forecast 3. Sudan. I. Wahab, A. A.**—*M.R.*

Meteorological Stations And Research Centers

10L–852 551.501.9:551.5

Church, Phil E. (*Univ. of Wash., Seattle, Wash.*), **The micrometeorological installation of University of Washington.** (In: U. S. Technical Conference on Air Pollution, Wash., D. C. 19

Pollution proceedings. 1952. p. 812–814. 2 figs.) **DLC** (TD887.U5)—The terrain on which tower is located (a turbulent location), the construction of the tower, the instrumentation of h mast and tower, the devices for studying soil heat flow, etc. are described. *Subject Headings:* **Micrometeorological stations 2. Seattle, Wash.**—*I.L.D.*

10L–853 551.501.9(09)(485)

Scientific research stations in North Sweden, 1903–57. *Polar Record*, Cambridge, Eng., 9(59): 4–156, May **1958. DLC**—This brief review is a summary of various articles from the Swedish erature dealing with the history and activities of the following four stations that in 1952 were ouped under the name of Kungliga Vetenskapsakademiens Forskigstationer i ovre Norrland oyal Academy of Sciences Research Stations in Upper Norrland): 1) Abisko Naturvetenskapliga tation, established in 1903, moved in 1912 to Abisko. Meteorological, seismic, geomagnetic, roral observations with emphasis now on botanical and zoological studies. 2) Sareks Naturveten- apliga Anlaggningar, located between lat. 67° and 67°30′N, consists of five observation huts. oradic meteorological observations are taken along with water level measurements. 3) Tarfadalens aciologiska Observatorium was established in 1946. A long term glaciological programme is nducted in cooperation with Alaska, Iceland and Norway. 4) Kiruna Geofysiska Observatorium tablished in 1914 is devoted to geomagnetism, seismology and meteorology for which additional cilities were provided in 1948 and 1957. *Subject Headings:* **1. Meteorological research stations Royal Academy of Sciences Research Stations in Upper Norrland 3. Sweden.**—*W.N.*

10L–854 551.501.9(675)

Stephan, Heinz (*Max Planck-Institut für Hirnforschung, Neuroanatomische Abteilung in Giessen*), **in modernes Forschungszentrum in Belgisch-Kongo.** [A modern research center in the Belgian ongo.] *Umschau*, Frankfurt, a.M., 58(15):470–472, Aug. 1, **1958.** 7 photos, map. **DLC**—The story of the establishment of the "Institut pour la Recherche Scientifique en Afrique Centrale" in 947 and the choice of a site for the construction of facilities at Lwiro is summarized. Construction egan in 1951 and the official dedication took place in 1956. The physical plant, types of laboratories nd other facilities, the favorable climatic situation of Lwiro and the research program are discussed. tudies on the ionosphere, solar radiation, radio astronomy and seismology (Lwiro, Elvira and strida) and astronomy (Tshibak) are planned. *Subject Headings:* **1. Meteorological research nstitutes 2. Institut pour la Recherche Scientifique en Afrique Centrale.**—*I.L.D.*

10L–855 551.501.9:551.508

U. S. Weather Bureau, **Drawings of instruments made by Station Facilities and Meteorological Observations Division, approved by Instrument Division.** (1952) entirely figs. unpaged. (some old.) **DWB** (M08 U587d)—A collection of extremely detailed plans, specifications, wiring diagrams nd architects' drawings of most of the standard equipment and facilities needed at a modern meteor- logical station. Plans include those for radar towers and installations, anemometer, pilot balloon heodolite and filling installations, instrument shelter, rain gages (recording and nonrecording), lotting board (for pibals), rotating ceilometer and detector, ceiling light, observer's instrument onsole, office layout, lighting and power outlet and source requirements, etc. etc. *Subject Headings:* **. Meteorological instrument installations 2. Meteorological station plans.**—*M.R.*

Observatories

10L–856 551.501.9

[Wise, W. Lance], **Scientists are winning the battle of prediction.** *Shamrock*, Amarillo, Tex., Jan./Feb. **1954,** p. 10–13. illus. **DWB**—The various services performed by the U. S. Weather Bureau Station at Albuquerque, N. M. under the supervision of Leslie A. Warren, are described nd nicely illustrated. The observations include radiosonde, radar wind and ceiling (with a 3,000,000 candlepower ceilometer) observations. Forecasting, climatological and hydrological work for New Mexico are also carried on at Albuquerque. *Subject Headings:* **1. Meteorological stations 2. Meteorological services 3. U. S. Weather Bureau 4. Albuquerque, N. M. I. Warren, Leslie A. (U. S. W. B., Albuquerque).**—*M.R.*

10L–857 551.501.9(09)

Blackwell, M. J., **Eskadalemuir Observatory: the first fifty years.** *Meteorological Magazine*, London, 87(1,031):129–132, May **1958.** 6 refs. Review in *Nature*, London, 182(4637):706, Sept. 13, **1958.**—The Observatory was established May 11, 1908. *Subject Headings:* **1. History of observa- tories 2. Eskdalemuir Observatory, Scotland.**—*W.N.*

10L–858 551.501.9:550.38.2

Alibag Observatory—Golden Jubilee. *Journal of Scientific and Industrial Research*, New Delhi, Sec. A, 14(2):53–54, Feb. **1955. DWB**—The magnetic observatory at Alibag near Bombay cele- brated its 50th anniversary Dec. 12, 1954. Its location (lat. 18°38′17″N, long. 72°52′21″E) is free

from any disturbing electrical effects, and the haematic composition of the laterite ground does affect the earth's magnetic field. The 2 buildings are constructed with nonmagnetic material otherwise designed to prevent any foreseen disturbance and equipped with modern instrume A symposium on geomagnetic activity and terrestrial relationships was arranged during the celel tion. More than 80 papers on terrestrial magnetism were contributed by the Observatory. *Sub Headings:* **1. Alibag Observatory, Bombay 2. Magnetic observatories 3. India.**—*W.N.*

10L–859 522.1:551.5(

Madwar, M. R., (*Helwan Obs., Egypt*), **Solar work and plans in Egypt.** (In: Beer, Art t (*ed.*), **Vistas in astronomy.** London, Pergamon Press, **1955.** Vol. 1:732–737. 2 figs., tabl **DLC** (QB3.B35)—Brief history of ancient Egyptian and Arab astronomy and present astronom work at Helwan Observatory (time service, study of nebulae and positional astronomy). Plans future use of the Observatory's 74-in. telescope are outlined (spectroscopy, planetary nebu bright-line stars, proper motion studies, etc.). Participation in the work connected with the 1 total eclipse, as well as activities of geophysical and meteorological departments of the Observat (magnetic observations, radiosonde observations and ionospheric sounding) are also mention *Subject Headings:* **1. Astronomical research 2. Observatories 3. Helwan Observatory, Egy** —*G.T.*

10L–860 551.501.9:550.3:061(673)(

†Vieira, Alexandre da Gama, **A secção de geofísica do Serviço Meteorológico de Angola.** [Sect of Geophysics in Meteorological Service of Angola.] Luanda, Angola, Servico Meteorológico, 19 26 p. 26 refs. **DWB**—Work of the Geophysics Section includes observations and research actinometry, seismology, geomagnetism, ionosphere, atmosphere and earth electricity and sc physics. The history of the work in these fields, beginning with the work of João Capelo (183 1901) for whom the observatory is named (geomagnetic observations were made from 1880–190 equipment of stations, notes on usefulness of observations in national economy, and a good list references comprise this monograph. *Subject Headings:* **1. Geophysical research 2. History observatories 3. Meteorological services 4. Angola.**—*M.R.*

Sites

10L–861 551.501.9:551.5

Davidson, Ben (*Geophysics Research Directorate*), **General description of site (of the Gre Plains Turbulence Field Program).** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring t atmosphere's first mile.** N. Y. Pergamon Press, **1957.** Vol. 2:377–383. 5 figs.) **DWB**—T description of the site which consisted of a 1 sq mi section of land located in the prairie country so 5 mi east-northeast of O'Neill, Neb. includes geophysical information (latitude and longitude elev tion, gravity, Coriolis parameter, etc.); topography; vegetation characteristics, including vegetati density, mowing data and natural vegetation changes and the large scale topography of the regio Diagrams illustrating the array of surface and free sampling methods on the field site, arrangeme of group sites along the observation line and topography of "mown grass area," photographs of t field site and of the terrain and a map showing ground topography are presented. *Subject Heading* **1. Great Plains Turbulence Field Program 2. O'Neill, Nebr.**—*I.L.D.*

10L–862 551.501.9:551.

Gregor, A. (*Prague*), **Ein Behelf zur Klassifikation des Expositionklimas.** [An aid to the clas fication of exposure climate.] *Wetter und Leben*, Vienna, 7(8/11):275–276, **1955. DLC**—T author summarizes a technique for describing more precisely the situation of climatic statio proposed by him at the Toronto meeting, 1947. It involves orientation with respect to the sk determination of the presence of local inversions, exposure with respect to wind direction and exposu with respect to natural and artificial surroundings. The symbolic representation of various situatio is illustrated with specific examples and the applicability of this method is discussed. *Subje Headings:* **1. Climatological station sites 2. Exposure climates.**—*I.L.D.*

10L–863 551.501.9:551.5

Schreyer, R., **Zur Kritik der Niederschlagsmessung in freier Lage.** [A criticism of precipitatic measurements in an open location.] *Wetter und Leben*, 6(1/2):26–27, March **1954.** 2 table **DWB**—Precipitation measurements obtained in an open and enclosed location are compared and it found that the latter receives more precipitation than the former. *Subject Headings:* **1. Precipitatic measurement 2. Rain gage sites.**—*I.L.D.*

Weather Stations

10L–864 551.501

Bennett, Andrew B. (*San José Weather Station*), **The San José Weather Station.** [1939? 6 p. Mimeo. **DWB**—A description of the station, scope of work, services rendered and notes

eral interest. Rainfall records have been kept since 1874 and a full time Weather Bureau station established in 1905. This was taken over by the municipal administration in 1933. Pressure, perature, humidity, wind, precipitation and sunshine data are obtained regularly and grouped 60 tabulations in a Daily Record and 290 tabulations in a Climatological Record. Frost fore- s, storm warnings and special forecasts are among the station's activities. *Subject Headings:* **Weather stations 2. San José, Calif.**—*G.T.*

10L–865 551.501.9:551.507

*Ivanov, G. S. and Khanaichenko, N. K., **Sudovaia distantsionnaia gidrometeorologicheskaia ntsiia** (SDS). [Remote control hydrometeorological station aboard ship.] *Meteorologiia i rologiia*, Leningrad, No. 3:48–50, March **1956.** figs., 2 tables. **DWB, DLC.** Transl. into English ilable for reference. **DWB** (M08.82 193ma)—The results of the comparisons of observations le with remote control weather stations with the observations made with standard instruments ied out in the Murmansk Sea, are presented in tables and are analyzed. The reliability of the ner observations is discussed. *Subject Headings:* **1. Remote control automatic weather stations Observational data comparisons 3. Murmansk Sea.**—*I.L.D.*

10L–866 551.501.9

Taillens, R., **La météorologie et les usagers non aéronautiques de la station du Mans.** [Meteor- gy and its nonaeronautical users of the Mans Station.] *La Météorologie, Paris*, Ser. 4, No. 462–466, Oct./Dec. **1954. DWB**—An analysis of the needs and requirements of La Mans Station rs is presented and discussed on the basis of 6 yrs of experience. They are divided into 3 groups the past time (climatology): 2) the future (weather forecasts); and 3) utilization in various ways the meteorologist's knowledge for the satisfaction of individual needs of the users. *Subject adings:* **1. Local forecasting services 2. Weather station services 3. Le Mans Station, France.** *M.P.*

PART C. INSTRUMENT CARRIERS (551.507)

WATER-BORNE VEHICLES OR SUPPORTS FOR METEOROLOGICAL INSTRUMENTS OR STATIONS (551.507.2)

10L–867 551.507.2:551.508.824

Corwin, E. F.; Appleby, J. C. and Allison, L. J. (*all, Aerology Div. Bureau of Aeronautics, Dept. Navy*), **The floating automatic weather stations of the United States Navy.** *Weatherwise*, Boston, (5):192–199, Oct. **1959.** 7 photos **DWB**—Several floating automatic weather stations are being veloped and used by the U. S. Navy. Some of these, namely, the Transobuoy, the Parachute eather Buoy, the Boat-type automatic Weather Station, the Hurricane Monitoring Buoy, are scribed at some length and illustrated photographically and schematically. The Transobuoy is e floating automatic station developed by the Naval Research Laboratory for use in the N. Atlantic d N. Pacific. Pressure, air, and sea surface temp., wind direction and speed are transmitted ery 6 hrs for about 6 months. It has been tested since 1957 and has been received up to 5000 mi way. The current model of the Parachute Weather Buoy is a combination of the "grasshopper" and e Hurricane Monitoring Buoy, developed also by NRL, and can operate for 2 months in a 6-hourly hedule. Wind direction, speed, pressure, air and sea temp. and station identification are trans- itted. It may be safely dropped from 500 ft. A boat-type station, 20 ft long and with a 10-ft eam, 2 masts, or flashing beam and bell, was developed in the David Taylor Model Basin and hiladelphia Naval Shipyard and the instrumentation at the National Bureau of Standards. It ansmits every 6 hrs on 5340 kc. Its anchor has weathered all storms so far in Gulf of Mexico 25 ft of water). The free floating Hurricane Buoy was developed by NRL and NBS in 1955 and as been heard up to 800–1000 mi in Gulf and Atlantic. *Subject Headings:* **1. Automatic weather ations 2. Floating automatic weather stations 3. Navy automatic weather stations. I. Allison, . J.**—*M.R.*

OCEAN WEATHER SHIPS (551.507.22)

10L–868 551.507.22:551.508.24 551.46.018

*Shellard, H. D. (*Marine Div., Met. Office*), **Some measurements of temperature and humidity rofiles near the sea surface.** *Marine Observer*, London, 28(182):198–204, Oct. **1958.** 3 figs., tables, 6 refs. **DLC**—A detailed account of the apparatus known as a "thermobuoy" that has been eveloped to take accurate measurements of the gradients of temperature and humidity near the ea surface when winds are not much above 12 knots. Observations taken at Station India (59°N, 9°W) on July 6 and 9, 1956 from 120 cm to +300 cm, below and above the sea surface, and profiles rawn from the data, are presented in tables and graphs. Profiles of temperature, humidity and

wind seem to be much the same. Results should be checked against similar measurements at c ocean weather stations. *Subject Headings:* **1. "Thermobuoy" 2. Ocean weather station 3. Automatic weather stations 4. Station India, North Atlantic.**—*M.R.*

10L–869 551.507.22:629.124.75 91.04:6

Kersten, W., **Hundert Fahrten Bordwetterdienst für die Hochseefischerei.** [Hundred voy with the ship weather station in the service of high sea fishing.] *Wetterlotse*, Hamburg, No. 139–140, July **1958. DWB**—The German fishery and meteorological research ship "Anton Dob completed her 100th reconnaissance voyage April 22, 1958. All the voyages of this ship and of "Meerkatze" and the "Poseidan" are tabulated according to number of times the listed mari areas have been surveyed; the data are also excellently illustrated on a map. The northern water surveyed is along Spitzbergen, Greenland, Iceland, and Norway, The British Isles and South most southwest coast of Portugal. *Subject Headings:* **1. Weather Ships 2. German weather "Anton Dohrn."**—*W.N.*

10L–870 551.507.22 551.465:533

New York University's research ship "Action." *Journal of Geophysical Research*, Washing D. C., 61(4):756, Dec. **1956. DLC**—G. NEUMANN arranged for the purchase of the University's research ship, the 65 foot schooner, "Action." Dr. NEUMANN, Professor of Oceanography, studied ocean waves and is engaged in research on ocean atmosphere interaction and long ra weather forecasting. *Subject Heading:* **1. Oceanographic ships.**—*S.F.*

10L–871 551.507.22

Philpott, L. B., **Shaw Savill and Albion Company, Limited.** *Marine Observer*, London, 28(1 220, Oct. **1958.** 3 photos. **DLC**—Account of the 85 yr history of three observing ships and t photographs. The 3 ships are the "Crusader" (1058 tons, bought in 1869) a sailing vessel w averaged 91 days to New Zealand and once made the trip in 69 days; the first "Athenic" (12,000 t 1901) and the second "Athenic" (built 1947). *Subject Heading:* **1. Ocean weather ships.**—*M.R.*

10L–872 551.507

Shellard, H. D., **New British Ocean Weather Ship.** *Weather*, London, 13(7):239–241, J **1958. DWB**—The "Weather Explorer" ended her last voyage May 8, 1958 and was replaced by "Weather Reporter," an adequately converted and modernized Castle class frigate, on May 16, 19 Description of the new weather ship and her instrumentation is given. *Subject Headings:* **1. Weat ships 2. British weather ship "Weather Reporter."**—*W.N.*

10L–873 551.507

Shulepin, A. M., **Iz opyta raboty gidrometeorologicheskoĭ stantsii Umba.** [Work of the Um hydrometeorological station.] *Meteorologiia i Gidrologiia*, Leningrad, No. 8:55–56, **1957. DW DLC**—The first order hydrometeorological station Umba (Murmansk Hydrometeorological Servi was organized in 1931 as a White Sea station of the State Hydrological Institute. The work of t station includes marine hydrometeorological observations and expeditions in the Gulf of Kandalaks meteorological and aerological observations for various branches of the national economy, for statio and river ports in southern part of the Kola Peninsula, etc. The method of work at this station, t educational activities, etc. are discussed briefly. *Subject Headings:* **1. Ocean weather statio 2. Hydrometeorological stations 3. Umba, U. S. S. R.**—*I.L.D.*

BALLOONS WITHOUT MEANS OF PROPULSION (551.507.321)

10L–874 551.507.321:551.509.332:551.55

Franceschini, Guy A. (*Dept. of Ocean. and Met. of A & M College of Texas*), **Results of rece trajectory studies.** *Meteorological Society of Japan, Tokyo, 75th Anniversary Vol. of the Journ* pub. Nov. **1957.** p. 268–270. **DWB, DLC**—Recent investigations conducted at the Agricultur and Mechanical College of Texas indicate the constant pressure balloon may play an increasing ro as a means of observing the atmosphere. Observed trajectories and those predicted may well for the basis of new methods of meteorological analyses and forecasting. The status of the proble present and future, is considered from a general standpoint. *Subject Headings:* **1. Constant lev ballons 2. Trajectory forecasting.**—*Author's abstract.*

10L–875 551.507.321:551.508.822(4

Kabot, F. F. and Lyzo, I. T., **Iz opyta raboty aerologicheskoĭ stantsii Brest.** [Work of t Brest Aerological Station (Soviet Union).] *Meteorologiia i Gidrologiia*, Leningrad, No. 8:47–4 Aug. **1958. DWB, DLC**—The authors describe the operational procedures at the Brest Aerologic Station which have resulted in high quality radiosonde observations in recent years. Balloons 3

ths old are released, and are kept in closets inaccessible to light and in unheated premises. Before se the balloons are heated in a thermostat at 60–65°C and then gone over with kerosene. They hen placed in a hermetically sealed container and kept in warm premises. Each shift prepares its ons one period of duty ahead. With onset of frost the balloons are placed in warm kerosene. instruments are kept in a humid closet. The radiosonde is held in the air before release at least hrs and it is ventilated at least 30 min. All the combs are counted by the technician before ase. Special attention is given to the preparation and construction of the radio unit. The rding of the observations, their technical control and inspection, the pressure chamber, the truction of the radio unit of the radiosonde, etc., are described. *Subject Headings:* **1. Radiosonde oon release 2. Brest Aerological Station, U.S.S.R.**—*I.L.D.*

10L–876 551.507.321:533.6

L'vov, G. M., **Teoreticheskoe issledovanie dvizheniia svobodnogo tela v neustanovivshemsia oke.** [Theoretical investigation of the movement of a free body in an unstable current., *Moscow. ntral'naia Aerologicheskaia Observatoriia, Trudy*, No. 22:22–31, **1957.** fig., 7 refs., 44 eqs. **DWB** n this theoretical analysis of the movement of a free body in an unstable current of an ideal and fluid, the author assumes in deriving the equation of motion of the body that the dimensions of accelerated current are incommensurably greater than the dimensions of the body and that the leration of the body does not produce an impact. The equation of motion of a free body in an table current of an ideal fluid and of the force of interaction between an ideal fluid and a body are ived from the equation of equilibrium of forces acting upon a body in accelerated movement under influence of an unstable current. In the case of the free movement of a body in an unstable rent of a real fluid the problem is solved first for a simple symmetrical body, such as a sphere, and n is generalized for bodies of any shape. *Subject Heading:* **1. Balloon movement theory.**—*I.L.D.*

10L–877 551.507.321:678(09)

Winzen, Otto C. (*Pres. of the Winzen Research, Inc. Minneapolis*), **Ten years of plastic balloons.** *ternational Astronautical Congress, Proceedings of the 8th Congress, Barcelona, 1957*, issued Vienna, 58. p. 436–459. 15 figs., table, 14 refs. English, German and French summaries p. 436. **DLC** L787.I44)—1957 is the 10th anniversary of the plastic stratosphere balloon. During this brief iod the new balloons have become reliable vehicles for upper atmosphere research and operational rk. From their early duties as delicate carriers of light loads, they have now been perfected to the nt where they can be used for the routine launching of light loads to altitudes in excess of 120,000 ft d heavy loads to altitudes of 80,000 ft and higher. Gross weights of over 5000 lbs have been flown date and balloons with volumes in excess of 3 million cu ft are being built on a production basis. e proposed 5 million cu ft balloon can carry a gross load of 10,000 lbs to 85,000 ft, but twice that d to 70,000 ft, doubling the load at a cost of only 15,000 ft altitude. Performance capability of a mily of plastic balloons is shown. The plastic balloon is also a practical tool for the investigation the human factors of space flight and manned space laboratories for high altitude studies. Most ectacular applications are the recent manned high altitude flights on USAF-Winzen Research oject *Manhigh* as well as the ONR-Winzen Research Inc. rockoon launchings in which balloons are ed as platforms in space-equivalent conditions for the launching of rockets, boosting their altitude pability substantially. This paper presents some details of balloon applications and takes a look o the future of balloons which stems from the development of the plastic cell. The future looks ight indeed. *Subject Headings:* **1. Plastic balloons 2. Stratospheric balloons 3. Balloon research.** *Author's abstract.*

FREE BALLOONS; SOUNDING BALLOONS (551.507.321.2)

10L–878 551.507.321.2:551.508

Minnesota. Univ. School of Physics, **Annual Progress Report and Technical Reports, Sept. 1, 956–Sept. 1, 1957.** Contract Nonr-710(22) "Atmospheric Physics Program." [Unnumbered eports on] 186 p. figs., and photos (some fold.) **DWB** (M07.321.2 M776at)—The University Minnesota presents a comprehensive report on the work of the Atmospheric Physics Program nducted during the period Sept. 1, 1956–Sept. 1, 1957. The material discussed is as follows: Infrared black ball; 2. Infrared radiometer; 3. Air temperature measurements; 4. Balloon physics d manufacture; 5. Air sampling; 6. Ionization measurements; 7. Instrument development work. *ubject Headings:* **1. Atmospheric Physics Program 2. Upper air measurement techniques 3. In- rument development.**—*N.N.*

10L–879 551.507.321.2:551.553.8(584.6)

Veidner, I. N., **O sharopilotnykh nabliudeniiakh pri sil'nom vetre.** [Pilot-balloon observations uring a strong wind.] *Meteorologiia i Gidrologiia*, Leningrad, No. 12:45–46, Dec. **1958. DLC** –During an investigation of the "Ursotev wind" a local wind in the Golodnaya Steppe, a special

technique was developed for making pibal observations at wind speeds exceeding 26 m/s. wind is a Hows in an easterly direction, chiefly during winter from the Fergana valley. This nique involves the use of a "tent" which consists of a cloth 1 sq i in size to whose corners ends of strong tape have been sewn. The ends are sewn together in pairs and form two knots. "tent" is thrown over the inflated balloon and is held by the tapes in such a way that the clot the four taped ends form a cover. In this way the inflated sphere is not subject to dangerous st ing and can withstand the necessary preparation for observation. The balloon is released by a swing of the "tent" and the simultaneous release of one of the tapes. *Subject Headings:* **1. balloon operation 2. Strong wind observation techniques 3. Golodnaya Steppe, Kazakh** —*I.L.D.*

AIRCRAFT (551.507.352)

10L–880 551.507.352:551.551.5:55

*Bunker, A. F., **Aircraft (PBY-6A) fluctuation and flux data—Woods Hole Oceanogr Institution.** (In: Lettau, H. H. and Davidson, Ben (*eds.*), **Exploring the atmosphere's first** N. Y. Pergamon Press, **1957.** Vol. 1:267–275. fig., 2 tables, 5 refs., 10 eqs.) **DWB**—A present of the airplane technique to obtain a series of simultaneous values of deviation velocities and tem tures to form stress and fluxes. Airplane lift theory is summarized and the equations for comp vertical velocities and the determination of horizontal turbulent component are derived. history of the use of PBY and instruments as a meteorological probe, the spectral range limita probable errors and comparisons with observations with other instruments (lower measurements discussed with the aid of data presented in tables and a graph. The flight procedure and the t in Vol. 2 are described. *Subject Headings:* **1. Airplane turbulence observations 2. Vertical velocity measurement techniques.**—*I.L.D.*

10L–881 551.507

*Fujita, Tetsuya and Omoto, Yukio, **Analysis of airplane flight observations.** Chicago. U Dept. of Meteorology, Contract CWB-8950, Technical Report, No. 2, May **1957.** 10 p. 14 4 refs. Also included in the Final Report, Pt. 1, issued **1957. DWB** (M15 C532fi)—Result analysis of two airplane observations taken over the Great Plains on May 13, 1956, are preser A new kind of chart, convenient to relate surface observations to airplane observations is empl in this analysis. The relative time lags among the instruments used in these observations calculated and the corrected and uncorrected results are computed. The airplane found small s but distinct, disturbances of the temperature and moisture fields which could hardly be detecte routine radiosonde observations. *Subject Headings:* **1. Airplane observation techniques 2. M analysis.**—*Authors' abstract.*

10L–882 551.507.352:551.326

*Hakodate, Japan. Marine Observatory, **Sea ice distribution maps in the Southern Okh Sea, 1937–1944.** pub. **1955.** 43 p. Almost entirely charts and tables. In Japanese.—Orig airplane observations to prevent cold damage to crops, started by an airplane offered by the N air base in Hokkaido, with the assistance of the Ministry of Agriculture, since the agricult disaster which occurred in 1934. The observations of K. Negishi, an employee of Hakodate Ma Observatory covered the period 1937–1944 embracing the sea area of 144–148° long. and 43–47° S. Okhotsk, flying height of 1000–2000 m, and time span 10AM–2PM in general, with observat during several days in each month, Jan.–March. All charts made by airplane track show: sea distribution, floating speed and direction, ice thickness and quantity, and general sea conditi Some data from 1939–1941 are missing, since there were lost through war damage. *Subject Headi* **1. Airplane observation (APOB) data 2. Sea ice distribution maps 3. Sea of Okhotsk.**—*K.C.*

PROJECTILES, ROCKETS (551.507.362.1)

10L–883 551.507.362.1:629.19:00

Haley, Andrew G., **International cooperation in rocketry and astronautics.** *Jet Propuls* 25(11):627–632, Nov. **1955.** 3 photos. **DLC**—The review starts with the early application military rockets in 1232 A.D. and ends with UNESCO programming. Ideas and theoretical for lations of rocketry and astronautics were exchanged on a more private basis between scientist several countries as long ago as in the first decades of the 20th century, but a more concrete internationally organized development may be said to have crystallized in the 1930's. Some of more prominent people and organizations who contributed and participated are discussed in relat to the following areas of activities: (1) cooperation between individuals and societies; (2) establi ment of awards and honors; (3) friendly contests and demonstrations; (4) nongovernmental int national organizations; (5) official channels and governmental organizations. *Subject Headin* **1. Rocketry 2. Astronautics.**—*W.N.*

10L–884 551.507.362.1:551.578.7(494)

*Switzerland. Eidg. **Kommission zum Studium der Hagelbildung und der Hagelabwehr, Schlussbericht über den Grossversuch Nr. I auf der Magadinoebene zur Bekämpfung des Hagels.** [Final report on Project I for Hail Control in the Magadino Plain.] Its *Wissenschaftliche Mitteilungen*, No. 7, **1955.** [Reprint?], p. 269–290. 2 figs., 8 tables. German, French and Italian summaries p. 288–290. **DWB,** (M(OSS)S979wi)—A detailed account of the futile hail prevention program 1948–1952, including tabulated data are given. During this period 129 firings of rockets carrying explosives of 100–800 g to altitudes of 530, 1010 and 1,500 m were made largely in the months April, May–Oct. There were 357 cases of hail in 28 communities, or total mean 12.7 days with thunderstorms, half of which were associated with cold fronts, average number 26, of which 3 with hail. *Subject Headings:* **1. Hail prevention in Switzerland 2. Hail rockets 3. Switzerland.**—*W.N.*

10L–885 557.507.362.1:621.398

Wilshusen, Fred, **Aspect system.** Colorado. Univ. Dept of Physics, Contract AF 19(604)-721, Final Report, May 1, 1955–Dec. 31, **1956.** 24 p. 11 figs., eqs.—The Rocket-borne aspect transmitter (ROBOAT) is a small device which continually records the angular and rotational aspect of a rocket during flight. The system uses the bearing angle of the sun as a reference and measures the angle to the horizon at various bearing angles to determine the angular aspect. The angular detectors are photosensitive germanium diodes which are mechanically scanned to give the proportional pulse time information. The information is recorded either by telemetering or by tape recorder. *Subject Heading:* **1. Rocket aspect measurement.**—*Author's abstract.*

ARTIFICIAL SATELLITES (551.507.362.2)

10L–886 551.507.362.2:531.56

Eggers, A. J., Jr. (*Ames Aeronautical Lab., Moffett Field, Calif.*), **Re-entry and recovery of a high-drag satellite initially in circular orbit about the earth.** (In: *U. S. Air Force. Office of Scientific Research, Vistas in astronautics: first annual Astronautics Symposium, Feb. 1957.* pub. N. Y. Pergamon Press, **1958.** p. 33–36. 2 figs. **DWB** (629.1388 U581as)—The results of calculations of the motion and heating of a sphere re-entering the Earth's atmosphere at satellite speed are discussed briefly. It is noted that neither decelerations nor surface temperatures would appear to be too high as to preclude the possibility of successful (i.e. nondestructive) re-entry of such a vehicle. It is indicated further that safe recovery of the vehicle may be effected by deploying a parachute at low altitude. The paper concludes with a list of several areas of aerodynamic research needing additional attention in connection with satellite re-entry problems. *Subject Heading:* **1. Satellite re-entry problems.**—*Author's abstract.*

10L–887 551.507.362.2

Evans, David S. (*Royal Observatory, Cape Providence, South Africa*), **Explorer (satellite 1958α)** over Africa. *Nature,* London, 181(4617):1173–1174, April 26, **1958.** table. **DWB**—Observations recorded at four Moonwatch stations established in South Africa at Johannesburg, Pretoria, Bloemfontein and Cape Town. Teams of amateur observers together with professionals from the observatories at the four centers, provided personnel for the stations. *Subject Headings:* **1. Satellite observational data 2. U. S. satellite, 1958 Alpha (Explorer I).**—*N.N.*

10L–888 551.507.362.2:551.11

Groves, G. V. (*Physics Dept. Univ. College, London*), **Effect of the earth's equatorial bulge on the life-time of artificial satellites and its use in determining atmospheric scale-heights.** *Nature,* London, 181(4615):1055, April 12, **1958.** 3 refs., 3 eqs. **DWB**—The data obtained from Sputniks 1 and 2 have indicated a shortening of their lifetime as they rotate slowly towards the equator on account of the equatorial bulge. The perigree sphere of 1957 alpha 2 moved from 42°N to 5°N whereas for 1957 beta, the perigree was at about 53°N and it reached the equator by March 19, and 3.7 km of the change in its height was attributed to the equatorial bulge. The method outlined in this report for the determination of the rate of orbital change of period will need further study, after which it might be used in the study of the variations of scale-height with latitude. *Subject Headings:* **1. Satellite orbits 2. Earth's equatorial bulge 3. Soviet satellites.**—*N.N.*

10L–889 551.507.362.2

Jacchia, Luigi (*Astrophysical Obs., Smithsonian Inst.*), **The descent of Satellite 1957 Beta one.** Reprinted from *International Geophysical Year, 1957/1958. IGY World Data Center A, IGY Satellite Series,* No. 6:25–38, Aug. 15, **1958.** *Smithsonian Institution. Astrophysical Observatory, (IGY Project 30.9 and 30.10), Special Report No. 15,* July 20, **1958. DWB** (629.1388 R425re)—An analysis is made of the observations of the final descent of the U.S.S.R. 1957 β. Evidence is based on three sources: from the northeastern U. S. observations, ships at sea and from the Caribbean Islands

and northern coast of South America. The numerical values of observation for this analysis : longitude, 74°W, latitude, 41.°40′N; height, 101 km above sea level, and the time of observat was the same from the localities of both sides of the satellite path: $1^h45^m25^s$ U.T. (April 14, 19 Its orbital inclination was 65.29° and its total velocity 7.737×10^5 cm/sec. *Subject Headi* **1. Satellite tracking 2. Satellite descents 3. Soviet satellite, 1957 Beta (Sputnik II).**—*N.N.*

10L–890 551.507.36

King-Hele, D. G. and Walker, D. M. C. (*Royal Aircraft Estab., South Farnborough, Ha* **The last minutes of satellite 1957 β** (Sputnik 2). *Nature*, London, 182(4633):426–427, Aug. 16, 19 fig. **DWB**—The plottings of the descending Sputnik 2 as observed visually and independer April 14, 1958 by British ships and others, as well as by three Moonwatch stations near New Yo agree very well. However, there is a sharp contrast in sofar as observations of colors are concerr The sparkling tail of the Sputnik 2 was estimated to vary between 30 and 90 nautical m wit brightness of stellar magnitude, −5 at a distance of 100 nautical mi between latitude 20°N and 15 *Subject Headings:* **1. Soviet Satellite 1957 Beta (Sputnik II) 2, Visual Satellite observations.**—*W*

10L–891 551.507.362.2:77

Leikin, G. A., **Ob ispol'zovanii svetevykh vspyshek dlia opredeleniia polozheniia iskusstvenny sputnikov Zemli.** [Use of light flares for determining the position of artificial earth satellite *Akademiia Nauk SSSR, Izvestiia, Ser. Geofiz.*, No. 12:1520–1521, Dec. **1958.** 4 refs. **DLC**— determining the position of an artificial earth satellite in space it is difficult to record the instant wh a satellite is at a particular point. In visual observations the error may exceed 0.5 sec. In pho graphic observations to register the time, instant interruptions of the track of the satellite are us These are achieved by such mechanical devices as obturators placed in the film or objective. T difficulties presented by these methods are summarized. When light flares are used it is sufficient know approximately the moment of the flare or its ordinate number in order to indicate the mom of flare with that accuracy which the installation on the satellite guarantees. Contemporary inst lations have an accuracy of the order of 1–0.01% interval. In order to determine the position of t satellite with an accuracy of 2.3 sec of arc it is necessary to provide a flare accuracy of 1 m/s. T flare arrangement for photographic observations is discussed. *Subject Headings:* **1. Satellite track 2. Photographic observation of satellites.**—*I.L.D.*

10L–892 551.507.362.2:521.3

Muller, P., **La fin du Sputnik II.** [The end of Sputnik II.] *L'Astronomie*, 72(4):141–14 April **1958.** 3 figs. **DLC**—Favorable atmospheric conditions made it possible to observe the l appearances of Sputnik II at Meudon Observatory in France. From April 10–13, the intermedi period oscillated between 89.89 min and 88.52 min, the mean altitude decreased progressively fr 280 km to 215 km and the passing heights from 370 to 215 km. The author gives a description the visual observation of the disappearance of Sputnik II, made by a Frenchman at Guadeloup The observed trajectory was completely in the earth's shadow and Sputnik II was clearly seen in f combustion. *Subject Headings:* **1. Visual satellite observations 2. Soviet satellite, 1957 Be (Sputnik II) 3. Meudon Observatory, France.**—*A.V.*

10L–893 551.507.363

Berichte über die Erdsatelliten. [Reports on the earth satellites.] *Naturwissenschaftlic Rundschau*, Stuttgart, 11(5):182–184, May **1958.** 4 figs., (incl. photos). **DLC**—An account American satellite launching attempts, including the first three successful launchings. Some deta concerning the rockets and satellites, their orbits and radio signals, are given. *Subject Heading* **1. U. S. sattellites 2. Satellite launching.**—*G.T.*

10L–894 551.507.362.2:778

*Rigollet, R., **Observations photographiques des positions de satellites artificiels.** [Phot graphic method of observing the positions of artificial satellites.] *Journal des Observateurs*, Marseil 41(8):129–131, Aug. **1958.** tables. **DLC**—Extension to artificial satellites of a photograph observation method, used by the author in 1953 to study meteor paths. For each point defin along the trajectory of the satellites, tables mention: hour angle, apparent declination, azimut zenith distance, and finally, in hundredths of seconds, the duration of course from a separate tim origin for every exposure. Tracings of stars serve as reference for the measurements. *Subje Headings:* **1. Satellite tracking 2. Photographic observation of satellites.**—*A.V.*

10L–895 551.507.362

Roberson, R. E. (*Autonetics, a Div. of North American Aviation, Inc., Downey, Calif.*), **Attitud control of a satellite vehicle—an outline of the problems.** *International Astronautical Congres Proceedings of the 8th Congress, Barcelona, 1957*, issued Vienna, **1958.** p. 317–339. 5 figs., 4 table

refs., 28 eqs. English, German and French summaries p. 317. **DLC** (TL787.I44)—The attitude of satellite vehicle must be controlled for many applications. This paper describes some of the fundamental problems associated with the design of an attitude control system. These include the choice of an attitude reference system and of reference axes within the body, and the nature of the attitude perturbation torques acting on the satellite. Attitude equations of motion are derived and a rationale for a control system synthesis is suggested. Control torque sources, the effects of vehicle configuration, and the role of attitude sensing devices are discussed. *Subject Heading:* **1. Satellite attitude control.**—*Author's abstract.*

10L–896 551.507.362.2

Vanguard to last 200 years. *Science*, Wash., D. C., 127(3306):1108, May 9, **1958. DLC**—Very brief note on the prediction made by J. T. HAGEN before and after the launching of Vanguard I in which the life expectancy was estimated to be 10 yrs. *Subject Headings:* **1. Satellite life span 2. U. S. satellite, 1958 Beta 2 (Vanguard I).**—*W.N.*

10L–897 551.507.362.2:629.19:061.3

Development of international efforts to avoid contamination of extraterrestrial bodies. *Science*, N. Y., 128(3329):887–889, Oct. 17, **1958. DLC**—A major scientific problem that came into being with the first satellite is that concerned with the contamination of celestial bodies by exploratory devices sent from the earth. At the instance of the National Academy of sciences, the first to give thought to this problem, The International Council of Scientific Unions established a Committee on Contamination by Extraterrestrial Exploration. The committee, also known as CETEX, met at The Hague, 12–13, May 1958, and considered in outline various aspects of the contamination problem: the moon's atmosphere, moon dust, cosmic dust, contamination of the moon by living cells, development of complex molecules and contamination of Mars and Venus. In view of contamination dangers the need was felt to effect a specific code of conduct concerning lunar and planetary exploration. CETEX recommendations to ICSU include the suggestions that interested and expert parties be asked to prepare detailed papers on the above mentioned topics for consideration before a second meeting of CETEX before the end of 1958, at which time detailed recommendations might be prepared with the aid of advisory experts. *Subject Headings:* **1. Contamination of extraterrestrial bodies I. International Council of Scientific Unions. Committee on Contamination by Extraterrestrial Exploration.**—*I.S.*

10L–898 551.507.362.2:613.693

Simons, David G. (*U. S. A. F. Holloman A. F. Base, New Mexico*), **Space medicine: the human body in space.** *Franklin Institute, Phil., Journal . . . Monograph*, No. 6:161–178, Dec. **1958.** 14 refs. **DWB** (629.1388 F832te)—The author, who has 10 yrs of research experience in space medicine, discussed the topic from the point of view of the four specific problems encountered by a man in space: (1) cosmic radiation (2) weightlessness (3) sealed-in-cabin environment and (4) man's psychological reactions to his space world existence. The early manned satellites will be orbiting at an altitude of 100–150 mi. *Subject Heading:* **1. Space medicine.**—*W.N.*

10L–899 551.507.362.2

Spincourt, J., **Le premier satellite américain.** [The first American satellite.] *La Nature*, Paris, 3275:102–103, March **1958.** 4 figs. **DLC**—Description of the first American satellite and its orbit. A section of the satellite shows the disposition of the principal components. *Subject Headings:* **1. Satellite observatories 2. U. S. satellite, 1958 Alpha (Explorer I).**—*A.V.*

10L–900 551.507.362.2:778.32

Vainu Bappu, M. K. (*Uttar Pradesh State Obs. Naini Tal*), **Optical tracking of artificial satellites.** *Journal of Scientific and Industrial Research*, New Delhi, Sec. A, 17(12), Special Supplement, Dec. **1958.** p. 95–98. 2 figs. (photos). **DWB, DLC**—This is a brief account of the photographic tracking on Manora Peak, Naini Tal, as carried out by equipment furnished by the Smithsonian Astrophysical Observatory, Cambridge, Mass. One hour after the Indian observations are taken the data are telegraphically received at Cambridge; the photographic frames follow for precise recording. Brief description of the camera and some characteristics of satellite tracking are given. *Subject Headings:* **1. Satellite tracking 2. Photographic observation of satellites 3. Manora Peak, India.**—*W.N.*

10L–901 551.507.362.2

Whipple, Fred L. and Hynek, J. Allen, **Observations of Satellite I.** *Scientific American*, New York, 197(6):37–43, Dec. **1957.** illustrations, 4 photos.—A detailed illustrated popular science article on the orbits of Sputnik I and methods of tracking it. The complex orbit paths are shown by numerous colored diagrams. *Subject Headings:* **1. Satellite tracking 2. Soviet satellites, 1957 Alpha 2 (Sputnik I).**—*M.R.*

PART D. AUTHOR AND SUBJECT INDEXES

In this section will be found reference to the number given at the head of each abstract or entr. Since this issue follows the Nov. 1959 issue (10K), items herein are designated by 10L. Items fro these supplementary issues are not included in the Annual Index to Vol. X, but will be included the 10 year Index for 1950–59. This index is divided into three parts:

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